







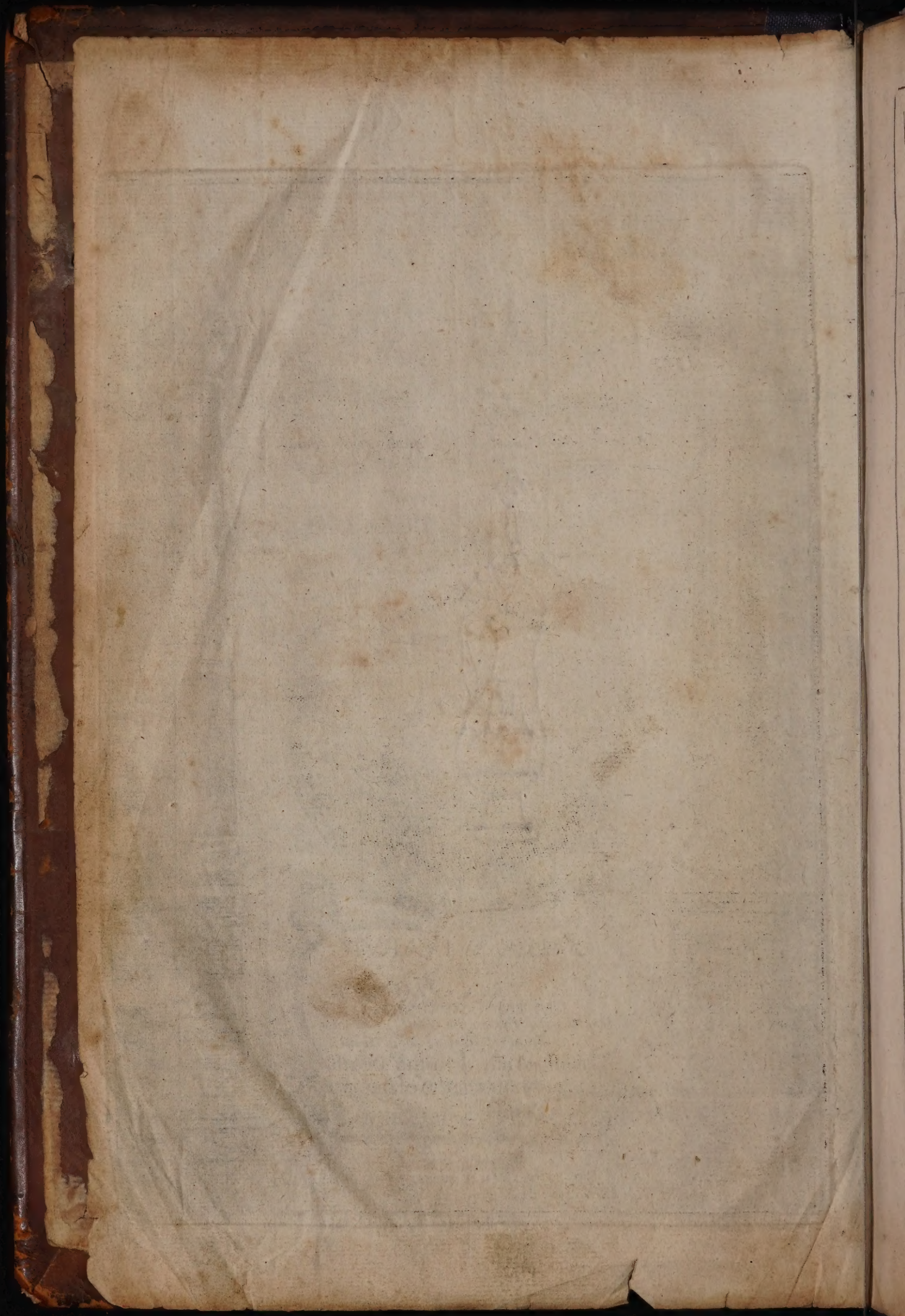
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SYLVA
SYLVARVM:

OR
A Naturall Historie.

IN TEN CENTURIES.

WRITTEN BY THE RIGHT
Honourable FRANCIS Lo. Verulam
Viscount S^r. ALBAN.

Published after the Authors death,
By WILLIAM RAWLEY Doctor of Divinity,
late his Lordships Chaplaine.

The second Edition.



LONDON,
Printed by J. H. for William Lee at the *Turkes*
Head in Fleet-street, next to the Miter. 1628.

S^r Broadhurst

SYLVIA
SYLVIA

OR

A Natural History.

IN TEN CRYSTALS.

WRITTEN BY THE RIGHT

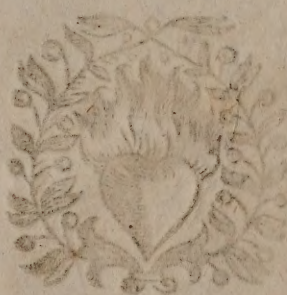
Honorable R. A. C. J. Esq.

Member of the Royal Society.

Published by the Author's death.

By WILLIAM R. A. C. J. Esq. Doctor of Divinity,
late his Majesty's Chaplain.

The second Edition.



LONDON,

Printed by J. H. for William Lee at the Turkey
Head in Fleet Street, next to the Mint, 1743.



TO THE MOST HIGH
AND MIGHTY PRINCE
CHARLES,
BY THE GRACE OF GOD,
King of Great Britaine, France, and
Ireland, Defender of the Faith, &c.

May it please your most Excellent Maiesty;



He whole Body of the *Natu-*
rall History, either designed,
or written, by the late *Lo.*
Viscount S. Alban, was dedi-
cated to your *Maiestie*, in his
Booke De Ventis, about foure
yeeres past, when your *Maiestie* was *Prince*.
So as there needed no new Dedication of this
Worke, but only, in all humbleness, to let your
Maiestie know, it is yours. It is true, if that *Lo.*
had liued, your *Maiestie*, ere long, had beene
inuoked, to the Protection of another *Historie*.
Whereof, not *Natures Kingdome*, as in this,
but

The Epistle Dedicatory.

but these of your *Maiesties*, (during the Time and *Raigne* of King *Henry* the *Eight*) had beene the Subject: Which since it died vnder the Designation meereley, there is nothing left, but your *Maiesties* Princely Goodnesse, graciously to accept of the Vndertakers Heart, and Intentions, who was willing to haue parted, for a while, with his Darling *Philosophie*, that he might haue attended your Royall Commandement, in that other *Worke*. Thus much I haue beene bold, in all lowlinesse, to represent vnto your *Maiestie*, as one that was trusted with his *Lordships* *Writings*, euen to the last. And as this *Worke* affecteth the *Stampe* of your *Maiesties* Royall Protection, to make it more currant to the *World*; So vnder the *Protection* of this *Worke*, I presume in all humblenessse to approach your *Maiesties* presence; And to offer it vp into your *Sacred* *Hands*.

Your *MAIESTIES* most Loyall

and *Devoted* Subject,

W. RAWLEY.



To the Reader.



Auing had the Honour to be continually with my Lord, in compiling of this *Worke*; And to be employed therein; I haue thought it not amisse, (with his Lordships good leaue and liking,) for the better satisfaction of those that shall reade it, to make knowne somewhat of his Lordships Intentions, touching the Ordering, and Publishing of the same. I haue heard his Lordship often say; that if should haue serued the glory of his owne Name, he had beene better not to haue published this *Naturall History*: For it may seeme an Indigested Heape of Particulars; And cannot haue that Lustre, which Bookes cast into Methods haue: But that he resolved to preferre the good of Men, and that which might best secure it, before any thing that might haue Relation to Himselfe. And he knew well, that

A

there

TO THE READER.

there was no other way open, to vnloose Mens minds, being bound; and (as it were) Maleficate, by the Charmes of deceiuing Notions, and Theories; and thereby made Impotent for Generation of Workes; but onely no where to depart from the Sense, and cleare experience; But to keepe close to it, especially in the beginning: Besides, this *Naturall History* was a Debt of his, being Designed and set downe for a third part of the *Instauration*. I haue also heard his Lordship discourse, that Men (no Doubt) will thinke many of the *Experiments* contained in this Collection, to bee Vulgar and Triuiall; Meane and Sordid; Curious and Fruitlesse: And therefore he wisheth, that they would haue perpetually before their Eies, what is now in doing; And the Difference betweene this *Naturall History*, and others. For those *Naturall Histories*, which are Extant, being gathered for Delight and Vse, are full of pleasant Descriptions and Pictures; and affect and seek after Admiracion, Rarities, and Secrets. But contrariwise, the Scope which his Lordship intendeth, is to write such a *Naturall History*, as may be Fundamental to the Erecting and Building of a true *Philosophy*: For the illumination of the *Vnderstanding*; the Extracting of *Axiomes*; and the producing of many Noble *Workes*, and *Effects*. For hee hopeth, by this meanes, to acquit Himselfe of that, for which he taketh
Himselfe

T O T H E R E A D E R .

Himselfe in a sort bound; And that is, the Advancement of all Learning & Sciences. For hauing in this present Worke Collected the Materials for the Building; And in his *Novum Organū* (of which his Lordship is yet to publish a Second Part,) set downe the Instruments and Directions for the VVorke; Men shall now be wanting to themselues, if they raise not Knowledge to that perfection, whereof the Nature of Mortall men is capable. And in this behalfe, I haue heard his Lordship speak complainingly; That his Lordship (who thinketh he deserueth to be an Architect in this building,) should be forced to bee a Work-man and a Labourer; And to dig the Clay and burne the Brick; And more than that, (according to the hard Condition of the *Israe'lites* at the latter end) to gather the Straw and Stubble, ouer all the Fields, to burne the Bricks withall. For he knoweth, that except he doe it, nothing will be done: Men are so set to despise the Meanes of their owne good. And as for the *Basenesse* of many of the Experiments; As long as they be Gods VVorks, they are Honourable enough. And for the *Vulgarnesse* of them; true *Axiomes* must be drawne from plaine Experience, and not from doubtful; And his Lordships course is, to make Wonders Plaine, and not Plaine things Wonders; And that Experience likewise must bee broken and grinded, and not whole, or as it

TO THE READER.

groweth. And for *Vse*; his Lordship hath often in his Mouth, the two kinds of *Experiments*; *Experimenta Fructifera*, and *Experimenta Lucifera*: *Experiments of Vse*, and *Experiments of Light*; And he reporteth himselfe, whether he were not a strange Man, that should thinke that Light hath no *Vse*, because it hath no Matter. Further, his Lordship thought good also, to adde vnto many of the *Experiments* themselves, some *Glosse* of the *Causes*; that in the succeeding worke of *Interpreting Nature*, and *Framing Axiomes*, all things may bee in more Readinesse. And for the *Causes* herein by Him assigned; his Lordship perswadeth Himselfe, they are farre more certaine, than those that are rendred by Others; Not for any Excellency of his owne Wit (as his Lordship is wont to say) but in respect of his continuall Conuersation with *Nature* and *Experience*. Hee did consider likewise, that by this Addition of *Causes*, Mens minds (which make so much haste to finde out the *Causes* of things,) would not thinke themselves vtterly lost, in a Vast Wood of *Experience*, but stay vpon these *Causes* (such as they are) a little, till true *Axiomes* may bee more fully discovered. I haue heard his Lordship say also, that one great Reason, why hee would not put these particulars into any exact *Method* (though he that looketh attentiuely into them, shall finde that they haue a secret Order)

TO THE READER.

Order) was, because he conceiued that other men would now thinke, that they could doe the like; And so goe on with a further Collection: which if the *Method* had beene Exact, many would haue despaired to attaine by Imitation. As for his Lordships loue of Order, I can refer any Man to his Lordships Latine Booke, *De Augmentis Scientiarum*; which (if my Iudgement be any thing) is written in the Exactest Order, that I know any Writing to be. I will conclude with an vsuall Speech of his Lordships; That this Worke of his *Naturall History*, is the *World*, as God made it, and not as Men haue made it; For that it hath nothing of Imagination.

W. Rawley.

A 3

This Epistle is the same, that should haue beene prefixed to this Booke, if his Lordship had liued.

Order) was, because he conceived that other
men would now think, that they could do the
like; And to go on with a further Collection:
which if the Author had been Exact, many
would have desired to attain by Imitation.
As for his Lordship's love of Order, I can re-
fer any Man to his Lordship's Large Book
De Augustinis Zele, which (if my Judge-
ment be any thing) is written in the Exactest
Order, that I know any Writing to be. I will
conclude with an extract of his Lord-
ship's; That this Work of his is a small Hilt
it is the World, as God made it, and not as Man
have made it; For there hath nothing of In-
gination.

W. R.

A

The Author
of the large
Book hath
been praised
to the Clouds
for his writing
habits.



NATVRALL HISTORIE.

I. Century.



Digge a *Pit* vpon the *Sea shore*, somewhat about the High-water Marke, and sinke it as deepe as the Low-Water marke; And as the *Tide* commeth in, it will fill with *Water*, Fresh and Potable. This is commonly practised vpon the Coast of *Barbary*, where other fresh *Water* is wanting. And *CAESAR* knew this well, when he was besieged in *Alexandria*: For by Digging of *Pits* in the *Sea shore*, hee did frustrate the Laborious Workes of the Enemies, which had turned the *Sea-Water* vpon the Wels of *Alexandria*; And so saued his Armie, being then in Desperation. But *Caesar* mistooke the Cause; For he thought that all *Sea-Sands* had Naturall Springs of *Fresh Water*. But it is plaine, that it is the *Sea-Water*; because the *Pit* filleth according to the Measure of the *Tide*: And the *Sea-water* passing or Straining thorow the Sands, leaueth the Saltnesse.

I remember to haue Read, that Triall hath beene made of *Salt Water* passed thorow *Earth*; thorow Ten Vessells, one within another, and yet it hath not lost his Saltnesse, as to become potable: But the same Man saith, that (by the Relation of Another,) *Salt Water* drained thorow twentie Vessells, hath become Fresh. This *Experiment* seemeth to crosse that other of *Pits*, made by the *Sea-side*; And yet but in part, if it be true, that twentie Repetitions doe the Effect. But it is worth the Note, how poore the Imitations of Nature are, in Common course of *Experiments*, except they be led by great Iudgement, and some good Light of *Axiomes*. For first, there is no small difference betweene a
Passage

I
Experiments
in Consort, tou-
ching the
Straining and
Passing of Bo-
dies, one tho-
row another:
which they call
Percolation.

2

Passage of *Water* thorow twenty small Vessells; And thorow such a distance, as betweene the Low water, and High water Marke. Secondly, there is a great difference betweene Earth and Sand. For all Earth hath in it a kinde of Nitrous Salt, from which Sand is more free: And besides Earth doth not straine the *Water* so finely, as Sand doth. But there is a Third Point, that I suspect as much, or more, than the other Two: And that is, that in the *Experiment* of *Transmission* of the *Sea-water* into the *Pits*, the *Water* riseth; But in the *Experiment* of *Transmission* of the *Water* thorow the Vessells, it falleth: Now certaine it is, that the Salter Part of *Water*, (once Salted thorow-out) goeth to the Bottome. And therefore no maruell, if the Draining of *Water* by descent, doth not make it fresh: Besides, I doe somewhat doubt, that the very Dashing of the *Water*, that commeth from the Sea, is more proper to strike off the Salt part, than where the *Water* slideth of her owne Motion.

3 It seemeth *Percolation* or *Transmission*, (which is commonly called *Straining*,) is a good kinde of *Separation*; Not onely of Thicke from Thin, and Grosse from Fine; But of more subtile Natures; And varieth according to the Body thorow which the *Transmission* is made. As if thorow a woollen Bagge, the Liquor leaueth the Fatnesse; If thorow Sand, the Saltnesse; &c. They speake of Seuering Wine from Water, passing it thorow Ivy wood, or thorow other the like porous Body; But *Non Constat*.

4 The *Gumme* of *Trees* (which wee see to be commonly shining and cleare) is but a fine Passage or *Straining* of the Iuice of the Tree, thorow the Wood and Barke. And in like manner, *Cornish Diamonds*, and *Rocke Rubies*, (which are yet more resplendent than *Gummes*) are the fine Exudations of *Stone*.

5 *Aristotle* giueth the Cause, vainly, why the *Feathers* of *Birds* are of more liuely Colours, than the *Haires* of *Beasts*; for no *Beast* hath any fine Azure, or Carnation, or Greene *Haire*. He saith, It is, because *Birds* are more in the Beames of the Sunne, than *Beasts*; But that is manifestly vntrue; For *Cattle* are more in the Sunne than *Birds*, that liue commonly in the Woods, or in some Couert. The true Cause is, that the Excrementious Moisture of liuing Creatures, which maketh as well the *Feathers* in *Birds*, as the *Haire* in *Beasts*, passeth in *Birds* thorow a finer and more delicate Strainer, than it doth in *Beasts*: For *Feathers* passe thorow Quills; And *Haire* thorow Skin.

6 The *Clarifying* of *Liquors* by Adhesion is an Inward *Percolation*; And is effected, when some Cleauing Body is Mixed and Agitated with the *Liquors*; whereby the grosser Part of the *Liquor* stickes to that Cleauing Body; And so the finer Parts are freed from the Grosser. So the *Apothecaries* clarifie their *Sirrups* by whites of Egges, beaten with the Iuices which they would clarifie; which Whites of Egges, gather all the Dregges and grosser Parts of the Iuyce to them; And after the *Sirrup* being set on the Fire, the whites of Egges themselues harden, and are

are taken forth. So *Ippocrasse* is clarified by mixing with Milke; And stirring it about; And then passing it thorow a Woollen Bag, which they call *Hippocrates Sleeve*: And the Cleauing Nature of the Milke draweth the Powder of the Spices, and Grosser parts of the *Liquor* to it; And in the passage they sticke vpon the Woollen Bag.

The *Clarifying* of *Water*, is an *Experiment* tending to Health; besides the pleasure of the Eye, when *Water* is Crystalline. It is effected by casting in and placing Pebbles, at the Head of a Current; that the *Water* may straine thorow them.

It may be, *Percolation* doth not onely cause Clearenesse and Splendor, but Sweetnesse of Sauour; For that also followeth, as well as Clearenesse, when the Finer Parts are seuered from the Grosser. So it is found, that the Sweats of men that haue much Heat, and exercise much, and haue cleane Bodies, and fine Skins, doe smell sweet; As was said of *Alexander*; And we see, commonly, that *Gummes* haue sweet Odours.

Take a *Glasse*, and put *Water* into it, and wet your Finger, and draw it round about the Lip of the *Glasse*, pressing it somewhat hard; And after you haue drawne it some few times about; it will make the *Water* friske and sprinckle vp, in a fine Dew. This *Instance* doth excellently Demonstrate the Force of *Compression* in a Solid Body. For whensoever a Solid Body (as Wood, Stone, Mettall, &c.) is pressed, there is an inward Tumult in the parts thereof, seeking to deliuer themselves from the *Compression*: And this is the Cause of all *Violent Motion*. Wherein it is strange in the highest Degree, that this *Motion* hath neuer beene obserued, nor inquired; It being of all *Motions*, the most Common, and the Chiefe Root of all *Mechanicall Operations*. This *Motion* worketh in round at first, by way of Prooffe, and Search, which way to deliuer it selfe; And then worketh in progresse, where it findeth the Deliuernance easiest. In *Liquors* this *Motion* is visible: For all *Liquors* stricken make round Circles, and withall Dash; but in *Solids*, (which breake not) it is so subtrill, as it is inuisible; But neuertheless bewrayeth it selfe by many Effects; As in this *Instance* whereof we speake. For the *Pressure* of the Finger furthered by the wetting (because it sticketh so much the better vnto the Lip of the *Glasse*) after some continuance, putteth all the small Parts of the *Glasse* into worke; that they strike the *Water* sharply; from which *Percussion* that Sprinkling commeth.

If you strike or pierce a *Solid Body*, that is brittle, as *Glasse*, or *Sugar*, it breaketh not only, where the immediate force is; but breaketh all about into shiuers and fitters; The *Motion*, vpon the *Pressure*, searching all waies; and breaking where it findeth the *Body* weakest.

The *Powder* in *Shot*, being Dilated into such a *Flame*, as endureth not *Compression*; Moueth likewise in round (The *Flame* being in the Nature of a *liquid Body*;) Sometimes recoiling; Sometimes breaking the *Piece*;

But

Experiments
in Consort
touching Mo-
tion of Bodies
vpon their
Pressure.

9

10

11

But generally discharging the *Bullet*, because there it findeth easiest Deliverance.

12

This *Motion* vpon *Pressure*, and the Reciprocall thereof, which is *Motion* vpon *Tensure*; we vse to call (by one common Name) *Motion of Liberty*; which is, when any *Body*, being forced to a *Preter-Naturall* Extent, or *Demension*, deliuereth and restoreth it selfe to the *Naturall*: As when a *Blowne Bladder* (Pressed) riseth againe; or when *Leather* or *Cloath* tentured spring backe. These two *Motions* (of which there be infinite instances) we shall handle in due place.

13

This *Motion* vpon *Pressure* is excellently also demonstrated in *Sounds*; As when one Chimeth vpon a *Bell*, it soundeth; but as soone as he layeth his hand vpon it, the *Sound* ceaseth: And so, the *Sound* of a *Virginnall String*, as soone as the *Quill* of a *Iacke* falleth vpon it, stoppeth. For these *Sounds* are produced, by the subtile Percussion of the Minute parts, of the *Bell*, or *String*, vpon the *Aire*; All one, as the *Water* is caused to leape by the subtile Percussion of the Minute parts of the *Glasse*, vpon the *Water*, whereof we spake a little before in the ninth *Experiment*. For you must not take it to be, the locall *Shaking* of the *Bell*, or *String*, that doth it. As we shall fully declare, when we come hereafter to handle *Sounds*.

Experiments
in Consort touch-
ing Separati-
ons of Bodies by
weight.

14

Take a *Glasse* with a *Belly* and a long *Neb*; fill the *Belly* (in part) with *Water*: Take also another *Glasse*, whereinto put *Claret Wine* and *Water* mingled; Reverse the first *Glasse*, with the *Belly* vpwards, Stopping the *Neb* with your finger; Then dip the Mouth of it within the Second *Glasse*, and remove your Finger: Continue it in that posture for a time; And it will vnmingle the *Wine* from the *Water*: The *Wine* ascending and setting in the top of the vpper *Glasse*; And the *Water* descending and setting in the bottome of the lower *Glasse*. The passage is apparant to the Eye; For you shall see the *Wine*, as it were, in a small veine, rising thorow the *Water*. For handsomnesse sake (because the Working requireth some small time) it were good you hang the vpper *Glasse* vpon a Naile. But as soone as there is gathered so much pure and vnmixed *Water* in the bottome of the Lower *Glasse*, as that the Mouth of the vpper *Glasse* dippeth into it, the *Motion* ceaseth.

15

Let the Vpper *Glasse* be *Wine*, and the Lower *Water*; there followeth no *Motion* at all. Let the Vpper *Glasse* be *Water* pure, the Lower *Water* coloured; or contrariwise; there followeth no *Motion* at all. But it hath beene tried, that though the Mixture of *Wine* and *Water*, in the Lower *Glasse*, beethree parts *Water*, and but one *Wine*; yet it doth not dead the *Motion*. This *Separation* of *Water* and *Wine* appeareth to be made by *Weight*; for it must be of *Bodies* of vnequall *Weight*, or else it worketh not; And the Heauier *Body* must euer be in the vpper *Glasse*. But then note withall, that the *Water* being made pensile, and there being a great *Weight* of *Water* in the *Belly* of the *Glasse*, sustained by

by a small Pillar of *Water* in the Necke of the *Glasse*; It is that, which setteth the *Motion* on worke: For *Water* and *Wine* in one *Glasse*, with long standing, will hardly seuer.

This *Experiment* would be Extended from Mixtures of seuerall *Liquors*, to *Simple Bodies*, which Consist of seuerall Similare Parts: Try it therefore with *Brine* or *Salt water*, and *Fresh water*; Placing the *Salt water* (which is the heauier) in the vpper *Glasse*; And see whether the *Fresh* will come aboue. Try it also with *Water thicke Sugred*, and *Pure water*; and see whether the *water* which commeth aboue, will lose his Sweetnesse: For which purpose it were good there were a little Cocke made in the Belly of the vpper *Glasse*.

IN *Bodies* containing Fine Spirits, which doe easily dissipate, when you make *Infusions*, the Rule is; A short Stay of the *Body* in the *Liquor* receiue the Spirit; And a longer Stay confoundeth it; because it draweth forth the Earthy Part withall; which embaseth the finer. And therefore it is an Errour in *Physitians*, to rest simply vpon the Length of stay, for increasing the vertue. But if you will haue the *Infusion* strong, in those kinde of *Bodies*, which haue fine Spirits, your way is, not to giue Longer time, but to repeat the *Infusion* of the *Bodie* oftner. Take *Violets*, and infuse a good Pugill of them in a Quart of Vineger; Let them stay three quarters of an houre, and take them forth; And refresh the *Infusion* with like quantitie of new *Violets*, seuen times; And it will make a Vineger so fresh of the *Flower*, as if a Twelue-moneth after, it bee brought you in a Saucer, you shall smell it before it come at you. Note, that it smelleth more perfectly of the *Flower*, a good while after, than at first.

This Rule, which we haue giuen, is of singular vse, for the Preparations of *Medicines*, and other *Infusions*. As for Example; The Lease of *Burrage* hath an Excellent Spirit, to repress the fuliginous Vapour of Duskie Melancholy, and so to cure Madnesse: But neuerthelesse, if the Lease be infused long, it yeeldeth forth but a raw substance, of no Vertue; Therefore I suppose, that if in the Must of Wine, or Wort of Beere, while it worketh, before it bee Tunned, the *Burrage* stay a small time, and be often changed with fresh; It will make a Soueraigne Drinke for Melancholy Passions. And the like I conceiue of *Orange Flowers*.

Rubarb hath manifestly in it Parts of contrary Operations: Parts that purge; And parts that binde the Bodie: And the first lay looser, and the latter lay deeper: So that if you infuse *Rubarb* for an houre, and crush it well, it will purge better, and binde the Bodie lesse after the purging, than if it stood twentie foure houres; This is tried: But I conceiue likewise, that by Repeating the *Infusion* of *Rubarb*, seuerall times, (as was said of *Violets*,) letting each stay in but a small time; you may make it as strong a *Purging Medicine*, as *Scammony*. And it is not a small thing wonne in *Physicke*, if you can make *Rubarb*, and other *Medicines*

16

Experiments
in *Confort*, touching
Iudicious
and *Accurate*
Infusions, both
in *Liquors*, and
Aire.

17

18

19

cines that are *Benedict*, as strong Purgers, as those that are not without some Malignity.

20 *Purging Medicines*, for the most part, haue their *Purgative* Vertue, in a fine Spirit; As appeareth by that they endure not boiling, without much losse of vertue. And therefore it is of good vse in *Physicke*, if you can retaine the *Purging* Vertue, and take away the Vnpleasant taste of the *Purger*; which it is like you may doe, by this course of *Infusing* oft, with little stay. For it is probable, that the Horrible and Odious Taste, is the Groffer part.

21 Generally, the working by *Infusions*, is grosse and blinde, except you first try the Issuing of the seuerall Parts of the Body, which of them Issue more speedily, and which more slowly; And so by apportioning the time, can take and leaue that Quality, which you desire. This to know, there be two waies; The one to try what long stay, and what short stay worketh, as hath beene said: The other to try in Order, the succeeding *Infusions*, of one and the same Body, successiue, in seuerall *Liquors*. As for example; Take *Orange-Pils*, or *Rose-Mary*, or *Cinnamon*, or what you will; And let them *Infuse* halfe an houre in *Water*: Then take them out, and *Infuse* them againe in other *Water*; And so the third time: And then taste and consider the *First Water*, the *Second*, and the *Third*: And you will find them differing, not only in Strength and Weaknesse, but otherwise in Taste, or Odour; For it may be the *First water* will haue more of the Scent, as more Fragrant; And the *Second* more of the Taste, as more Bitter or Biting, &c.

22 *Infusions* in *Aire*, (for so wee may well call *Odours*) haue the same diuersities with *Infusions* in *Water*; In that the seuerall *Odours* (which are in one Flower, or other Body) issue at seuerall times; Some earlier, some later: So we finde that *Violets*, *Woodbines*, *Strawberries*, yeeld a pleasing Scent, that commeth forth first; But soone after an ill Scent, quite differing from the Former; Which is caused, not so much by Mellowing, as by the late issuing of the Groffer Spirit.

23 As we may desire to extract the finest Spirits in some Cafes; So we may desire also to discharge them (as hurtfull) in some other. So *Wine burnt*, by reason of the *Evaporating* of the finer Spirit, enflameth lesse, and is best in Agues: *Opium* leeseeth some of his poisonous Quality, if it be vapoured out, mingled with *Spirit of Wine*, or the like: *Sean* leeseeth somewhat of his windinesse by Decocting; And (generally) subtil or windy Spirits are taken off by incension, or *Evaporation*. And euen in *Infusions* in things that are of too high a Spirit, you were better powre off the first *Infusion*, after a small time, and vse the latter.

Experiment
Solitary touching the
Appetite of Continuations in
Liquids.

24

Bubbles are in the forme of an *Hemisphere*; *Aire* within, and a little Skin of *Water* without: And it seemeth somewhat strange, that the *Aire* should rise so swiftly, while it is in the *Water*; And when it commeth to the top, should be staid by so weake a Couer as that of the *Bubble* is. But as for the swift Ascent of the *Aire*, while it is vnder the

the *Water*, that is a *Motion* of *Percussion* from the *Water*; which it selfe descending, driueth vp the *Aire*; and no *Motion* of *Leuity* in the *Aire*. And this *Democritus* called *Motus Plaga*. In this Common Experiment, the Cause of the Enclosure of the *Bubble* is, for that the Appetite to resist Separation, or Discontinuance (which in solid *Bodies* is strong) is also in *Liquours*, though fainter and weaker; As we see in this of the *Bubble*: we see it also in little Glasse of Spittle that children make of *Rushes*; And in Castles of *Bubbles*, which they make by blowing into *Water*, hauing obtained a little Degree of Tenacity by Mixture of *Soape*: We see it also in the *Stillicides* of *water*, which if there be *water* enough to follow, will Draw themselves into a small thred, because they will not discontinue; But if there be no Remedy, then they cast themselves into round Drops; which is the Figure, that sauerth the Body most from Discontinuance: The same Reason is of the Roundnesse of the *Bubble*, as well for the Skin of *water*, as for the *Aire* within: For the *Aire* likewise auoideth *Discontinuance*; And therefore casteth it selfe into a Round Figure. And for the stop and Arrest of the *Aire* a little while, it sheweth that the *Aire* of it selfe hath little, or no Apperite, or Ascending.

THE Reiection, which I continually vse, of *Experiments*, (though it appeareth not) is infinit; But yet if an *Experiment* be probable in the Worke, and of great Vse, I receiue it, but deliuer it as doubtfull. It was reported by a Sober Man, that an *Artificiall Spring* may be made thus: Finde out a hanging Ground, where there is a good quicke Fall of Rain-water. Lay a Half-Trough of Stone, of a good length, three or foure foot deep within the same Ground; with one end vpon the high Ground, the other vpon the low. Couer the Trough with Brakes a good thickeesse, and cast Sand vpon the Top of the Brakes: You shall see (saith hee) that after some showers are past, the lower End of the Trough will runne like a *Spring* of *Water*: which is no maruell, if it hold, while the Rain-water lasteth; But he said it would continue long time after the Raine is past: As if the water did multiply it selfe vpon the *Aire*, by the helpe of the Coldnesse and Condensation of the Earth, and the Confort of the first *Water*.

THE *French* (which put off the Name of the *French Disease*; vnto the Name of the *Disease* of *Naples*) doe report, that at the Siege of *Naples*, there were certaine wicked Merchants, that Barrellled vp *Mans flesh* (of some that had beene, lately slaine in *Barbery*) and sold it for *Tunny*; And that vpon that foule and high Nourishment, was the Originall of that *Disease*. Which may well be; For that it is certaine, that the *Canibals* in the *West Indies*, eat *Mans flesh*; And the *West Indies* were full of the Pocks when they were first discovered: And at this day the *Mortallest poisons*, practised by the *West-Indians*, haue some Mixture of the *Bloud*, or *Fat*, or *Flesh* of *Man*: And diuers *Witches*, and

Experiment
Solitary touching the
Making of Artificiall
Springs.

25

Experiment
Solitary touching the
Venemous Quality
of Mans Flesh.

26

Sorceresses, as well amongst the *Heathen*, as amongst the *Christians*, haue fed vpon *Mans flesh*, to aid (as it seemeth) their Imagination, with High and foule Vapours.

Experiment
Solitary touching the
Version and Trans-
mutation of
Aire into *Water*.

27

IT seemeth that there be these waies (in likelihood) of *Version* of *Vapours*, or *Aire*, into *Water* and *Moisture*. The first is *Cold*; which doth manifestly Condense; As wee see in the *Contracting* of the *Aire* in the *Weather-Glasse*; whereby it is a Degree neerer to *Water*. We see it also in the *Generation* of *Springs*, which the *Ancients* thought (very probably) to be made by the *Version* of *Aire* into *Water*, holpen by the *Rest*, which the *Aire* hath in those Parts; whereby it cannot dissipate. And by the *Coldnesse* of *Rocks*; for there *Springs* are chiefly generated. Wee see it also in the Effects of the *Cold* of the *Middle Region* (as they call it) of the *Aire*; which produceth *Dews*, and *Raines*. And the Experiment of turning *Water* into *Ice*, by *Snow*, *Nitre*, and *Salt* (whereof wee shall speake hereafter) would be transferred to the Turning of *Aire* into *Water*. The Second way is by *Compression*; As in *Stillatories*, where the Vapour is turned backe, vpon it selfe, by the Encounter of the Sides of the *Stillatory*; And in the *Dew* vpon the Couers of *Boyling Pots*; And in the *Dew* towards *Raine*, vpon *Marble*, and *Wainscot*. But this is like to doe no great effect; Except it be vpon Vapours, and grosse *Aire*, that are already very neere in Degree to *Water*. The Third is that, which may be searched into, but doth not yet appeare; which is, by *Mingling* of moist Vapours with *Aire*; And trying if they will not bring a Returne of more *Water*, then the *water* was at first: For if so; That Increase is a *version* of the *Aire*: Therefore put water into the Bottome of a *Stillatory*, with the *Neb* stopped; Weigh the *Water* first; Hang in the Middle of the *Stillatory* a large *Sponge*; And see what Quantity of *Water* you can crush out of it; And what it is more, or lesse, compared with the *water* spent; For you must vnderstand, that if any *version* can be wrought, it will be easieft done in small Pores: And that is the Reason why we prescribe a *Sponge*. The Fourth way is Probable also, though not Appearing; Which is, by *Receiuing* the *Aire* into the small Pores of *Bodies*; For (as hath beene said) euery thing in small Quantity is more easie for *version*; And Tangible Bodies haue no pleasure in the Consort of *Aire*, but endeaour to subact it into a more *Dense Body*: But in *Entire Bodies* it is checked; because if the *Aire* should Condense, there is nothing to succeed: Therefore it must be in loose *Bodies*, as *Sand* and *Powder*; which we see, if they lie close, of themselues gather Moisture.

Experiment
Solitary touching
Helpes towards the
Beauty and
good Features
of Persons.

28

IT is reported by some of the *Ancients*; That *Whelps*, or other *Creatures*, if they be put Young, into such a Cage, or Box, as they cannot rise to their Stature, but may encrease in Breadth, or length; will grow accordingly, as they can get Roome: which if it bee true, and faisible, and that the young *Creature* so pressed, and straitened,

tened, doth not thereupon die; It is a Meanes to produce *Dwarfe Creatures*, and in a very Strange Figure. This is certaine, and noted long since; That the Pressure or Forming of Parts of Creatures, when they are very young, doth alter the Shape not a little; As the Stroaking of the Heads of Infants, betweene the Hands, was noted of Old, to make *Macrocephali*; which shape of the Head, at that time, was esteemed. And the Raising gently of the Bridge of the Nose, doth preuent the Deformity of a Saddle Nose. Which obseruation well weighed, may teach a Meanes, to make the Persons of Men, and Women, in many kinds, more comely, and better featured, than otherwise they would be; By the Forming and Shaping of them in their Infancy: As by Stroaking vp the Calues of the Legs, to keepe them from falling downe too low; And by Stroaking vp the Forehead to keepe them from being low-foreheaded. And it is a common Practise to swathe Infants, that they may grow more straight, and better shaped: And we see Young Women, by wearing straight Bodies, keepe themselues from being Grosse, and Corpulent.

O *Nions*, as they hang, will many of them shoot forth; And so will *Penni-roiall*; And so will an Herbe called *Orpin*; with which they vse, in the Country, to trim their Houses, binding it to a Lath, or Sticke, and setting it against a wall. We see it likewise, more especially, in the greater *Semper-vine*, which will put out Branches, two or three yeeres: But it is true, that commonly they wrap the Root in a Cloth besmeared with *Oile*, and renue it once in halfe a Yeere. The like is reported by some of the *Ancients*, of the *Stalks of Lillies*. The Cause is; For that these *Plants* haue a Strong, Dense, and Succulent Moisture, which is not apt to exhale; And so is able, from the old store, without drawing helpe from the Earth, to suffice the sprouting of the *Plant*: And this Sprouting is chiefly in the late Spring, or early Sommer; which are the Times of Putting forth. We see also, that *Stumps of Trees*, lying out of the ground, will put forth Sprouts for a Time. But it is a Noble Triall, and of very great Consequence, to try whether these things, in the Sprouting, doe increase *Weight*; which must be tried by weighing them before they bee hanged vp; And afterwards againe, when they are sprouted. For if they encrease not in *Weight*; Then it is no more but this; That what they send forth in the Sprout, they leese in some other Part: But if they gather *Weight*, then it is *Magnale Natura*; For it sheweth that *Aire* may be made so to be Condensed, as to be conuerted into a *Dense Body*; whereas the Race and Period of all things, here about the Earth, is to extenuate and turne things to bee more *Pneumaticall*, and Rare; And not to be Retrograde, from *Pneumaticall* to that which is *Dense*. It sheweth also, that *Aire* can *Nourish*; which is another great Matter of Consequence. Note, that to try this, the Experiment of the *Semper-vine* must bee made without Oiling the Cloth; For else, it may be, the *Plant* receiueth Nourishment from the Oile.

Experiment
Solitary touching the
Condensing of Aire,
in such sort as
it may put on
Weight, and
yeeld Nourishment.

29

Experiment
Solitary tou-
ching the Com-
mixture of
Flame and Aire,
and the great
Force thereof.

30

Flame and Aire doe not Mingle, except it be in an *Instant*; Or in the *Vitall Spirits* of *vegetables*, and *living Creatures*. In *Gunpowder*, the Force of it hath beene ascribed, to Rarefaction of the Earthy Substance into *Flame*; And thus farre it is true: And then (forsooth) it is become another Element; the Forme whereof occupieth more place; And so, of Necessity, followeth a Dilatation: And therefore, lest two Bodies should be in one place, there must needs also follow an Expulsion of the pellet; Or Blowing vp of the Mine. But these are Crude and Ignorant Speculations. For *Flame*, if there were nothing else, except it were in very great quantity, will be suffocate with any hard Body, such as a Pellet is, Or the Barrell of a Gunne; So as the *Flame* would not expell the hard Body; But the hard Body would kill the *Flame*, and not suffer it to kindle, or spread. But the cause of this so potent a Motion, is the *Nitre*, (which we call otherwise *Salt-Petre*;) which hauing in it a notable Crude and windy *Spirit*, first by the *Heat* of the *Fire* suddenly dilateth it selfe; (And we know that simple *Aire*, being preternaturally attenuated by *Heat*, will make it selfe Roome, and breake and blow vp that which resisteth it;) And Secondly, when the *Nitre* hath dilated it selfe, it bloweth abroad the *Flame*, as an inward Bellowes. And therefore we see that *Brimstone*, *Pitch*, *Camphire*, *Wilde-Fire*, and diuers other Inflamable Matters, though they burne cruelly, and are hard to quench; Yet they make no such fiery winde, as *Gunpowder* doth: And on the other side, we see that *Quick-siluer*, (which is a most Crude and Watry Body) heated, and pent in, hath the like force with *Gunpowder*. As for *living Creatures*, it is certaine, their *Vitall Spirits* are a Substance Compounded of an *Airy* and *Flamy* Matter; And though *Aire* and *Flame* being free, will not well mingle; yet bound in by a *Body* that hath some fixing, they will. For that you may best see in those two Bodies (which are their *Aliments*,) *Water*, and *Oile*; For they likewise will not well mingle of themselues, but in the Bodies of *Plants*, and *living Creatures*, they will. It is no maruell therefore, that a small *Quantity* of *Spirits*, in the Cells of the Braine, and Canales of the Sinewes, are able to moue the whole Body, (which is of so great Masse) both with so great Force, as in Wrestling, Leaping; And with so great Swiftnesse, As in playing Diuision vpon the *Lute*. Such is the force of these two Natures, *Aire* and *Flame*, when they incorporate.

Experiment
Solitary tou-
ching the Se-
cret Nature of
Flame.

31

TAke a small *Wax Candle*, and put it in a Socket, of *Brasse*, or *Iron*; Then set it vpright in a *Porringer* full of *Spirit of Wine*, heated: Then set both the *Candle*, and *Spirit of Wine*, on fire, and you shall see the *Flame* of the *Candle*, open it selfe, and become 4. or 5. times bigger than otherwise it would haue beene; and appeare in Figure *Globular*, and not in *Piramis*. You shall see also, that the Inward *Flame* of the *Candle* keepeth Colour, and doth not wax any whit blue towards the Colour of the Outward flame of the *Spirit of Wine*. This is a Noble Instance;

Instance; wherein two things are most remarkable; The one; that one *Flame* within another quencheth not; but is a fixed Body, and contrieth as *Aire*, or *Water* doe. And therefore *Flame* would still ascend upwards in one greatnesse, if it were not quenched on the *Sides*: And the greater the *Flame* is at the Bottome, the higher is the Rise. The other, that *Flame* doth not mingle with *Flame*, as *Aire* doth with *Aire*, or *Water* with *Water*, but only remaineth contiguous; As it commeth to passe betwixt Consisting Bodies. It appeareth also, that the forme of a *Piramis* in *Flame*, which we vsually see, is meere by Accident, and that the *Aire* about, by quenching the *Sides* of the *Flame*, crusheth it, and extenuateth it into that Forme; For of it selfe it would be Round: And therefore *Smoake* is in the Figure of a *Piramis* Reuerfed; For the *Aire* quencheth the *Flame*, and receiue the *Smoake*. Note also, that the *Flame* of the *Candle*, within the *Flame* of the *Spirit of Wine*, is troubled; And doth not onely open and moue vpwards, but moueth wauiing, and to and fro: As if *Flame* of his owne Nature (if it were not quenched) would rowle and turne, as well as moue vpwards. By all which, it should seeme, that the *Cælestiall* Bodies, (most of them) are true *Fires* or *Flames*, as the *Stoicks* held; More fine (perhaps) and Rarified, than our *Flame* is. For they are all Globular, and determinate; They haue Rotation; And they haue the Colour and Splendour of *Flame*: So that *Flame* aboue is Durable, and Consistent, and in his Naturall place; But with vs, it is a Stranger, and Momentany, and Impure; Like *Vulcan* that halted with his Fall.

TAKE an *Arrow*, and hold it in *Flame*, for the space of ten pulses; And when it commeth forth; you shall finde those Parts of the *Arrow*, which were on the Outfides of the *Flame*, more burned, blacked, and turned almost into a Coale; whereas that in the Middest of the *Flame*, will be, as if the Fire had scarce touched it. This is an *Instance* of great consequence for the discouery of the Nature of *Flame*; And sheweth manifestly, that *Flame* burneth more violently towards the *Sides*, than in the Middest: And, which is more, that *Heat* or *Fire* is not violent or furious, but where it is checked and pent. And therefore the *Peripatetickes* (howsoeuer their opinion of an *Element* of *Fire* about the *Aire* is iustly exploded;) in that Point they acquit themselues well: For being opposed, that if there were a *Spheare* of *Fire*, that incompassed the Earth so neere hand, it were impossible but all things should be burnt vp; They answer, that the pure *Elementall Fire*, in his owne place, and not irritate, is but of a Moderate *Heat*.

IT is affirmed constantly by many, as an vsuall Experiment; That a *Lumpe* of *Fre*, in the Bottome of a Mine, will be tumbled, and stirred, by two Mens strength; which if you bring it to the Top of the Earth, will aske Six Mens strength at the least to stirre it. It is a Noble *Instance*. and is fit to be tried to the full: For it is very probable, that the Motion

Experiment
Solitary touching the Different force of *Flame* in the Middest and on the *Sides*.

Experiment
Solitary touching the Decrease of the Naturall motion of Gravity in great distance from the Earth, or within some depth of the Earth.

of Gravity worketh weakly, both farre from the Earth, and also within the Earth: The former, because the Appetite of Vnion of Dense Bodies with the Earth, in respect of the distance, is more dull; The latter, because the Body hath in part attained his Nature, when it is some Depth in the Earth. For as for the Morning to a *Point* or place (which was the Opinion of the *Ancients*) it is a meere Vanity.

Experiment
Solitary touching the
Contraction of Bodies
in Bulke, by the Mixture
of the more Liquid Body
with the more Solid.

34

IT is strange, how the *Ancients* tooke vp *Experiments* vpon credit, and yet did build great Matters vpon them. The Obseruation of some of the best of them, deliuered confidently is, That a *Vessel* filled with *Asbes*, will receiue the like quantity of *Water*, that it would haue done, if it had beene empty. But this is vtterly vntrue; for the *Water* will not goe in by a Fifth part. And I suppose, that that Fifth part is the difference of the lying close, or open, of the *Asbes*; As we see that *Asbes* alone, if they be hard pressed, will lie in lesse roome: And so the *Asbes* with Aire betweene, lie looser; and with *Water*, closer. For I haue not yet found certainly, that the *Water*, it selfe, by mixture of *Asbes*, or *Dust*, will shrinke or draw into lesse Roome.

Experiment
Solitary touching the
Making Vines more
fruitfull.

35

IT is reported of credit, that if you lay good store of *Kernels* of *Grapes*, about the *Root* of a *Vine*, it will make the *Vine* come earlier, and prosper better. It may be tried, with other *Kernels*, laid about the *Root* of a *Plant* of the same kinde; As *Figs*, *Kernels* of *Apples*, &c. The Cause may be, for that the *Kernels* draw out of the Earth Iuice fit to nourish the *Tree*, as those that would be *Trees* of themselves, though there were no *Root*; But the *Root* being of greater strength, robbeth and deuoureth the Nourishment, when they haue drawne it: As great *Fishes* deuoure little.

Experiments
in Confort
touching Purging
Medicines.

36

THE Operation of *Purging Medicines*, and the Causes thereof, haue bin thought to be a great Secret; And so according to the slothful manner of Men, it is referred to a *Hidden Propriety*, a *Specificall vertue*, and a *Fourth Qualitie*, and the like Shifts of Ignorance. The Causes of *Purging* are diuers; All plaine and perspicuous; And thoroughly maintained by Experience. The first is, That whatsoeuer cannot be overcome and digested by the *Stomacke*, is by the *Stomacke*, either put vp by *Vomit*, or put downe to the *Guts*; And by that *Motion* of *Expulsion* in the *Stomacke*, and *Guts*, other *Parts* of the *Body* (as the *Orifices* of the *Veines*, and the like) are moued to expell by *Consent*. For nothing is more frequent than *Motion* of *Consent* in the *Body* of Man. This Surcharge of the *Stomacke*, is caused either by the *Qualitie* of the *Medicine*, or by the *Quantitie*. The *Qualities* are three: *Extreme Bitter*, as in *Aloës*, *Coloquintida*, &c. *Loathsome* and of horrible taste, As in *Agarick*, *Blacke Hellebore*, &c. And of *secret Malignity*, and disagreement towards *Mans Bodie*, many times not appearing much in the Taste; As in *Scammony*, *Mechoacham*, *Antimony*, &c. And note well, that if there be any *Medicine*, that

that *Purgeth*, and hath neither of the first two *Manifest Qualities*; it is to be held suspected, as a kinde of *Poison*; For that it worketh either by *Corrosion*; or by a *secret Malignitie* and Enmity to *Nature*: And therefore such *Medicines* are warily to be prepared, and vsed. The *Quancity* of that which is taken, doth also cause *Purging*; as we see in a great *Quantitie* of *New Milke* from the Cow; yea and a great *Quantity of Meat*; For *Sursets* many times turne to *Purges*, both vpwards, and downwards. Therefore we see generally, that the working of *Purging Medicines*, commeth two or three houres after the *Medicines* taken; For that the *Stomacke* first maketh a prooffe, whether it can concoct them. And the like happeneth after *Sursets*; Or *Milke* in too great *Quantitie*.

A second Cause is *Mordication* of the *Orifices* of the *Parts*; Especially of the *Mesentery veines*; As it is seene, that *Salt*, or any such thing that is sharpe and biting, put into the *Fundament*, doth prouoke the Part to expell; And *Mustard* prouoketh Sneezing: And any Sharpe Thing to the Eyes, prouoketh Teares. And therefore we see that almost all *Purgers* haue a kinde of *Twitching* and *vellication*, besides the *Griping* which commeth of wind. And if this *Mordication* be in an ouer-high Degree, it is little better than the *Corrosion* of *Poyson*; And it commeth to passe sometimes in *Antimony*; Especially if it be giuen, to Bodies not repleat with Humors; For where Humors abound, the Humors saue the Parts.

The third Cause is *Attraction*: For I doe not deny, but that *Purging Medicines* haue in them a direct Force of *Attraction*; As *Drawing Plasters* haue in *Surgery*: And we see *Sage*, or *Bettony brused*, *Sneezing powder*, and other *Powders* or *Liquors* (which the *Physicians* call *Errhines*.) put into the Nose, draw *Flegme*, and water from the Head; And so it is in *Apophlegmatismes*, and *Gargarismes*, that draw the Rheume downe by the *Pallat*. And by this Vertue, no doubt, some *Purgers* draw more one Humour, and some another, according to the Opinion receiued: As *Rubarb* draweth Choller; *Sean* Melancholy; *Agarick* Flegme; &c. But yet, (more or lesse) they draw promiscuously. And note also, that besides Sympathy, betweene the *Purger* and the *Humour*, there is also another Cause, why some *Medicines* draw some Humour more than another. And it is, for that some *Medicines* worke quicker than others: And they that draw quicke, draw onely the Lighter, and more fluide Humours; they that draw slow, worke vpon the more Tough, and Viscous Humours. And therefore Men must beware, how they take *Rubarb*, and the like, alone, familiarly; For it taketh only the Lightest part of the Humour away, and leaueth the Masse of Humours more obstinate. And the like may be said of *Worme-wood*, which is so much magnified.

The fourth Cause is *Flatuosity*; For *Wind* stirred moueth to expell: And we finde that (in effect) all *Purgers* haue in them a raw *Spirit*, or *Wind*; which is the Principall Cause of *Tortion* in the *Stomack*, and *Belly*. And therefore *Purgers* leese (most of them) the vertue, by *Decoction* vpon the Fire; And for that Cause are giuen chiefly in *Infusion*, *Iuyce*, or *Powder*.

The

40

The fifth Cause is *Compression*, or *Crushing*: As when *Water* is Crushed out of a *Sponge*: So we see that *Taking Cold* moueth Loosenesse by Contraction of the Skinne, and outward Parts; And so doth *Cold* likewise cause *Rheumes*, and *Defluxions* from the Head; And some *Astringent Plasters* crush out purulent Matter. This kind of Operation is not found in many *Medicines*: *Mirabolanes* haue it; And it may be the *Barkes of Peaches*; For this Verrue requireth an *Astriction*; but such an *Astriction*, as is not gratefull to the Body: (For a pleasing *Astriction* doth rather Binde in the Humours, than Expell them:) And therefore such *Astriction* is found in Things of an Harriſh Taste.

41

The Sixth Cause is *Lubrefaction*, and *Relaxation*. As wee see in *Medicines Emollient*; Such as are *Milke*, *Honey*, *Mallows*, *Lettuce*, *Mercuriall*, *Pelletory of the Wall*, and others. There is also a secret Verrue of *Relaxation* in *Cold*: For the *Heat* of the Body bindeth the Parts and Humours together, which *Cold* relaxeth: As it is seene in *Vrine*, *Bloud*, *Pottage*, or the like; which, if they be *Cold*, breake, and dissolue. And by this kinde of *Relaxation*, *Feare* loosenth the Belly; because the *Heat* retiring inwards towards the Heart, the Guts and other Parts are relaxed; In the same manner, as *Feare* also causeth Trembling in the Sinewes. And of this Kinde of *Purgers* are some *Medicines* made of *Mercury*.

42

The Seuenth Cause is *Absterſion*; which is plainly a *Scouring off*, or *Incision* of the more viscos Humors, and making the Humors more fluide; And Cutting betweene them, and the Part. As is found in *Nitrous Water*, which scoureth Linnen Cloth (speedily) from the Foulensse. But this *Incision* must be by a *Sharpnesse*, without *Astriction*: Which wee finde in *Salt*, *Worme-wood*, *Oxymel*, and the like.

43

There be *Medicines*, that moue *Stooles*, and not *Vrine*; Some other, *Vrine*, and not *Stooles*. Those that *Purge by Stoole* are such as enter not at all, or little into the *Mesentery Veines*; But either at the first are not digestible by the *Stomacke*, and therefore moue immediatly downwards to the *Guts*; Or else are afterwards reiected by the *Mesentery Veines*, and so turne likewise downwards to the *Guts*; and of these two kinds are most *Purgers*. But those that moue *Vrine*, are such, as are well digested of the *Stomacke*, and well receiued also of the *Mesentery Veines*; So they come as farre as the *Liner*, which sendeth *Vrine* to the *Bladder*, as the *Whey* of *Bloud*: And those *Medicines* being Opening and Piercing, doe fortifie the Operation of the *Liner*, in sending downe the wheyey Part of the *Bloud* to the *Reines*. For *Medicines Vrinatiue* doe not worke by Reiection, and Indigestion, as *Solutiue* doe.

44

There be diuers *Medicines*, which in greater *Quantitie*, moue *Stooles*, and in smaller, *Vrine*: And so contrariwise, some that in greater *Quantitie*, moue *Vrine*, and in Smaller, *Stooles*. Of the former sort is *Rubarb*, and some others. The Cause is, for that *Rubarb* is a *Medicine*, which the *Stomacke* in a small *Quantity* doth digest, and overcome, (being not Flatuous, nor Loathsome;) and so sendeth it to the *Mesentery Veines*; And so being opening, it helpeth downe *Vrine*: But in a greater *Quantitie*, the

the *Stomacke* cannot overcome it, and so it goeth to the *Guts*. *Pepper* by some of the *Ancients* is noted to be of the second sort; which being in small *Quantitie*, moueth wind in the *Stomacke* and *Guts*, and so expelleth by *Stoole*; But being in greater *Quantitie*, dissipateth the *Wind*; And it selfe getteth to the *Mesentery* *veines*; And so to the *Liu*er, and *Reines*; where, by Heating and Opening, it sendeth downe *Vrine* more plentifully.

WE haue spoken of *Euacuating* of the *Bodie*; we will now speake something of the *Filling* of it by *Restoratiues* in *Consumptions*, and *Emaciating Diseases*. In *Vegetables*, there is one part that is more Nourishing than another; As *Graines*, and *Roots* nourish more, than the *Leaues*; In so much as the *Order* of the *Foliatanes* was put downe by the *Pope*, as finding *Leaues* vnable to Nourish Mans Body. Whether there be that difference in the *Flesh* of *Liuing Creatures*, is not well inquired: As whether *Liners*, and other *Entrailes*, be not more Nourishing, than the *Outward Flesh*. We finde that amongst the *Romans*, a *Gooses Liuer* was a great Delicacy; In so much as they had Artificiall Meanes to make it faire, and great; But whether it were more Nourishing, appeareth not. It is certaine, that *Marrow* is more Nourishing than *Fat*. And I conceiue that some Decoction of *Bones*, and *Sinewes*, stamped, and well strained, would be a very *Nourishing Broth*: Wee finde also that *Scotch Skincke*, (which is a Pottage of strong Nourishment,) is made with the *Knees*, and *Sinewes* of *Beefe*: but long boiled: *Jelly* also, which they vse for a Restorative, is chiefly made of *Knuckles* of *Veale*. The *Palpe* that is within the *Crasfish* or *Crabb*, which they spice and butter, is more Nourishing than the *Flesh* of the *Crabb* or *Crasfish*. The *Yolkes* of *Egges* are clearely more Nourishing than the *Whites*. So that it should seeme, that the Parts of *Liuing Creatures*, that lye more Inwards, nourish more than the *Outward Flesh*: Except it be the *Braine*; which the Spirit prey too much vpon, to leaue it any great Vertue of Nourishing. It seemeth for the Nourishing of Aged Men, or Men in *Consumptions*, some such thing should be Deuised, as should be halfe *Chylus*, before it be put into the *Stomacke*.

Take two large *Capons*; perboile them vpon a soft fire, by the space of an houre, or more, till in effect all the Bloud be gone. Adde in the Decoction the *Pill* of a *Sweet Limon*, or a good part of the *Pill* of a *Citron*, and a little *Mace*. Cut off the *Shanckes*, and throw them away. Then with a good strong Chopping-knife, mince the two *Capons*, bones and all, as small as ordinary Minced Meat; Put them into a large neat Boulter; Then take a *Kilderkin*, sweet, and well seasoned, of foure gallons of Beere, of *S.S.* strength, new as it commeth from the Tunning; Make in the *Kilderkin* a great Bung-hole of purpose: Then thrust into it, the Boulter (in which the *Capons* are) drawne out in length; Let it steepe in it three Dayes, and three Nights, the Bung-hole open, to worke; Then close the Bung-hole, and so let it continue, a Day and a halfe; Then draw

Experiments
in *Confort*, touching
Meats
and *Drinks* that
are most Nourishing.

45

46

draw it into Bottles, and you may drinke it well after three dayes Bottelling; And it will last six weekes (approved.) It drisketh fresh, flowreth and mantleth exceedingly; It drinketh not newish at all; It is an excellent Drinke for a Consumption, to be drunke either alone, or Carded with some other beere. It quenched Thirst, and hath no whit of windinesse. Note, that it is not possible, that Meat and Bread, either in Broths, or taken with Drinke, as is vsed, should get forth into the veines, and outward Parts, so finely, and easily, as when it is thus Incorporate, and made almost a *Chylus* aforehand.

47 Triall would be made of the like Brew with *Potado Roots*, or *Burre Roots*, or the *Pith* of *Artichoakes*, which are nourishing Meats: It may be tried also, with other flesh; As *Pheasant*, *Partridge*, *Young Porke*, *Pigge*, *Venison*, especially of *young Deere*, &c.

48 A *Mortresse* made with the *Browne* of *Capons*, stamped, and strained, and mingled (after it is made) with like quantitie, (at the least,) of *Almond Butter*; is an excellent Meat to Nourish those that are weake; Better than *Blanc-Manjar*, or *Jelly*: And so is the *Cullice* of *Cockes*, boyled thicke with the like Mixture of *Almond Butter*: For the *Mortresse*, or *Cullice*, of it selfe, is more Sauoury and strong; And not so fit for Nourishing of weake Bodies; But the *Almonds* that are not of so high a taste as *Flesh*, doe excellently qualifie it.

49 *Indian Mai* hath (of certaine) an excellent Spirit of Nourishment; But it must be thorowly boyled, and made into a *Mai-Cream* like a *Barley Cream*. I iudge the same of *Rize*, made into a Cream; For *Rize* is in *Turky*, and other Countries of the East, most fed vpon; But it must be thorowly boyled in respect of the Hardnesse of it: And also because otherwise it bindeth the Body too much.

50 *Pistachoes*, so they be good, and not mustie, ioyned with *Almonds* in *Almond Milke*; Or made into a *Milke* of themselues, like vnto *Almond Milke*, but more greene, are an excellent Nourisher. But you shall doe well, to adde a little *Ginger*, scraped, because they are not without some subtrill windinesse.

51 *Milke* warme from the Cow, is found to be a great Nourisher, and a good Remedy in *Consumptions*: But then you must put into it, when you milke the Cow, two little bagges; the one of *Powder* of *Mint*, the other of *Powder* of *Red Roses*; For they keepe the *Milke* somewhat from Turning, or Crudling in the stomacke; And put in Sugar also, for the same cause, and partly for the Tastes sake; But you must drinke a good draught that it may stay lesse time in the stomacke, lest it Crudle: And let the Cup into which you milke the Cow, be set in a greater Cup of hot water, that you may take it warme. And *Cow-milke* thus prepared, I iudge to be better for a *Consumption*, than *Asse-milke*, which (it is true) turneth not so easily, but it is a little harrish; Marry it is more proper for Sharpnesse of *Vrine*, and Exulceration of the Bladder, and all manner of Lenifyings. *Womans milke* likewise is prescribed, when all faile; but I commend it not; as being a little too neere the Iuyce of Mans

Mans Bodie, to be a good Nourisher; Except it be in *Infants*, to whom it is Naturall.

Oyle of *Sweet Almonds*, newly drawne, with *Sugar*, and a little *Spice*, spread vpon Bread tosted, is an Excellent Nourisher; But then to keepe the Oyle from frying in the Stomacke, you must drinke a good draught of *Milde Beere* after it; And to keepe it from relaxing the Stomack too much, you must put in a little Powder of *Cinnamon*.

The *Tolkes* of *Egges* are of themselves so well prepared by Nature for Nourishment; As (so they be Potched, or Reare boiled) they need no other Preparation, or Mixture; yet they may be taken also raw, when they are new laid, with *Malmesey*, or *Sweet wine*; You shall doe well to put in some few Slices of *Eryngium Roots*, and a little *Amber-grice*; For by this meanes, besides the immediate Facultie of Nourishment, such Drinke will strengthen the Backe; So that it will not draw downe the *Vrine* too fast; For too much *Vrine* doth alwayes hinder Nourishment.

Mincing of meat, as in *Pies*, and *buttered Minced Meat*, saue the Grinding of the Teeth; And therefore, (no doubt) it is more Nourishing; Especially in Age; Or to them that haue weake Teeth; But the Butter is not so proper for weake Bodies; And therefore it were good to moisten it with a little *Claret wine*, Pill of *Limon*, or *Orange*, cut small, *Sugar*, and a very little *Cinnamon*, or *Nutmegg*. As for *Chuets*, which are likewise minced Meate, in stead of Butter, and Fat, it were good to moisten them, partly with *Creame*, or *Almond*, or *Pistacho milke*; or *Barly*, or *Maiz Creame*; Adding a little *Coriander Seed*, and *Carraway Seed*, and a very little *Saffron*. The more full Handling of *Alimentation* we referue to the due place.

Wee haue hitherto handled the Particulars which yeeld best, and easiest, and plentifullest Nourishment; And now we will speake of the best Meanes of Conueying, and Conuerting the Nourishment.

The First Meanes is, to procure that the Nourishment may not be robbed, and drawne away; wherein that, which we haue already said, is very Materiall; To prouide, that the *Reines* draw not too strongly an ouer-great Part of the *Bloud* into *Vrine*. To this adde that Precept of *Aristotle*, that *Wine* be forborne in all *Consumptions*; For that the *Spirits* of the *Wine*, doe prey vpon the *Roside Iuyce* of the Body, and inter-common with the *Spirits* of the Body, and so deceiue and rob them of their Nourishment. And therefore if the *Consumption* growing from the weaknesse of the Stomacke, doe force you to vse *Wine*; let it alwayes be burnt, that the Quicker *Spirits* may euaporate; or at the least quenched with two little wedges of *Gold*, six or seuen times repeated. Adde also this Prouision, That there be not too much *Expence* of the Nourishment, by *Exhaling*, and *Sweating*: And therefore if the Patient be apt to sweat, it must be gently restrained. But chiefly *Hippocrates* Rule is to be followed; who aduiseeth quite contrary to that which is in vse: Namely, that the *Linnen*, or *Garment* next the *Flesh*, be in *Winter* drie, and oft changed;

changed; And in Sommer seldome changed, and smeared ouer with Oyle; For certaine it is, that any Substance that is fat, doth a little fill the Pores of the Body, and stay Sweat, in some Degree. But the more cleanly way is, to haue the *Linnen* smeared lightly ouer, with Oyle of *Sweet Almonds*; And not to forbear shifting as oft as is fit.

56

The Second *Meanes* is, to send forth the *Nourishment* into the *Parts*, more strongly; For which, the working must be by *Strengthening* of the *Stomack*; And in this, because the *Stomack* is chiefly comforted by *Wine*, and *Hot things*, which otherwise hurt; it is good to resort to *Outward Applications* to the *Stomack*: Wherein it hath beene tried, that the *Quilts* of *Roses*, *Spices*, *Mastick*, *Worme-wood*, *Mint*, &c. are nothing so helpfull, as to take a *Cake* of *New bread*, and to bedew it with a little *Sack*, or *Alegant*; And to drie it; And after it be dried a little before the Fire, to put it within a cleane Napkin, and to lay it to the *Stomacke*: For it is certaine, that all Flower hath a potent Vertue of *Astriction*; In so much as it hardneth a peece of flesh, or a Flower, that is laid in it: And therefore a *Bagge* quilted with *Bran*, is likewise very good; but it drieth somewhat too much; and therefore it must not lye long.

57

The third *Meanes* (which may be a Branch of the former) is to send forth the *Nourishment* the better by *Sleepe*. For we see, that Beares, and other *Creatures* that *sleepe* in the Winter, wax exceeding fat: And certaine it is, (as it is commonly beleeued) that *Sleepe* doth Nourish much; Both for that the Spirits do lesse spend the *Nourishment* in *Sleepe*, then when liuing *Creatures* are awake: And because (that which is to the present purpose) it helpeth to thrust out the *Nourishment* into the *Parts*. Therefore in Aged men, and weake Bodies, and such as abound not with Choller, a short *Sleepe* after dinner doth helpe to Nourish; For in such Bodies there is no feare of an ouer-hastie Digestion, which is the Inconuenience of Postmeridian *Sleepes*. *Sleepe* also in the Morning, after the taking of somewhat of easie Digestion; As *Milke* from the Cow, *Nourishing Broth*, or the like; doth further *Nourishment*: But this would be done, sitting vpright, that the *Milke* or *Broth* may passe the more speedily to the bottome of the *Stomacke*.

58

The Fourth *Meanes* is to provide that the *Parts* themselves may draw to them the *Nourishment* strongly. There is an Excellent Obseruation of *Aristotle*; That a great Reason, why Plants (some of them) are of greater Age, than *Liuing Creatures*, is, for that they yearely put forth new Leaues, and Boughes; whereas *Liuing Creatures* put forth (after their Period of Growth,) nothing that is young, but Haire and Nalles; which are Excrements, and no *Parts*. And it is most certaine, that what-soeuer is young, doth draw *Nourishment* better, than that which is Old; And then (that which is the Mystery of that Obseruation) young Boughes, and Leaues, calling the Sap vp to them; the same Nourisheth the *Body*, in the Passage. And this we see notably proued also, in that the oft Cutting, or Polling of *Hedges*, *Trees*, and *Herbs*, doth conduce much to their Lasting. Transfere therefore this Obseruation to the
Helping

Helping of Nourishment in *Living Creatures*: The Noblest and Principall Use whereof is, for the *Prolongation of Life*; *Restauration* of some Degree of *Youth*; and *Inteneration* of the *Parts*: For certaine it is, that there are in *Living Creatures* Parts that Nourish, and Repaire easily; And Parts that Nourish and repaire hardly, And you must refresh, and renew those that are easie to Nourish, that the other may be refreshed, and (as it were) Drinke in Nourishment, in the Passage. Now we see that *Draught Oxen*, put into good Pasture, recover the Flesh of young Beefe; And Men after long Emaciating Diets, wax plumpe, and fat, and almost New: So that you may surely conclude, that the frequent and wise Use of those *Emaciating Diets*, and of *Purgings*; And perhaps of some kind of *Bleeding*; is a principall Meanes of *Prolongation of Life*; and *Restoring* some Degree of *Youth*: For as we haue often said, *Death* commeth vpon *Living Creatures* like the Torment of *Mezentius*;

Mortua quinetiam iungebat Corpora uinis,

Componens Manibusq; Manus, atq; Oribus Ora.

For the Parts in Mans Body easily reparable (as *Spirits*, *Blond*, and *Flesh*) die in the Embracement of the Parts hardly reparable (as *Bones*, *Nerves*, and *Membranes*;) And likewise some *Entrails* (which they reckon amongst the *Spermatieall Parts*) are hard to repaire: Though that Diuision of *Spermatieall*, and *Menstruall Parts*, be but a Conceit. And this same *Observation* also may be drawne to the present purpose of Nourishing Emaciated Bodies: And therefore *Gentle Friction* draweth forth the Nourishment, by making the Parts a little hungry, and heating them; whereby they call forth Nourishment the better. This *Friction* I wish to be done in the Morning. It is also best done by the *Hand*, or a peece of *Scarlet Wooll*, wet a little with *Oile of Almonds*, mingled with a small Quantity of *Bay-sale*, or *Saffron*. We see that the very Currying of Horses doth make them fat, and in good liking.

The Fifth Meanes is, to further the very Act of *Assimilation* of Nourishment; which is done by some outward *Emollients*, that make the Parts more apt to *Assimilate*. For which I haue compounded an *Ointment* of Excellent Odour, which I call *Roman Ointment*, vide the *Receit*. The use of it would be betweene Sleeper; For in the latter Sleeper the Parts *Assimilate* chiefly.

There be many *Medicines*, which by themselves would doe no Cure, but perhaps Hurt; but being applied in a certaine Order, one after another, doe great Cures. I haue tried (my selfe) a *Remedy* for the *Gout*, which hath seldome failed, but driuen it away in 24. Houres space: It is first to apply a *Pulasse*; of which vide the *Receit*; And then a *Bath* or *Fomentation*, of which vide the *Receit*; And then a *Plaster*, vide the *Receit*. The *Pulasse* relaxeth the Pores, and maketh the Humour apt to Exhale. The *Fomentation* calleth forth the Humour by Vapours; But yet in regard of the way made by the *Pulasse*, Draweth gently; And therefore draweth the Humour out; and doth not draw more to it; For it

Experiment
Solitary touching
Filum
Medicinale.

60

is a *Gentle Fomentation*, and hath withall a Mixture (though very little) of some *Stupefactine*. The *Plaister* is a Moderate *Astringent Plaister*, which repelleth New Humour from falling. The *Pulcasse* alone would make the Part more soft, and weake; And apter to take the Defluxion and Impression of the Humour. The *Fomentation* alone, if it were too weake, without way made by the *Pulcasse*, would draw forth little; If too strong, it would draw to the Part, as well as draw from it. The *Plaister* alone, would pen the Humour already contained in the Part, and so exasperate it, as well as forbid new Humour. Therefore they must be all taken in Order, as is said. The *Pulcasse* is to be laid to for two or three Houres: The *Fomentation* for a Quarter of an Houre, or somewhat better, being vsed hot, and seuen or eight times repeated: The *Plaister* to continue on still, till the Part be well confirmed.

Experiment
Solitary tou-
ching Cure by
Custome.

61

Here is a secret Way of Cure (vnpractized,) By *Assuetude* of that which in it selfe hurteth. *Poisons* haue bin made, by some, Familiar, as hath beene said, *Ordinary keepers* of the *Sicke* of the *Plague*, are seldome infected. *Enduring of Torture*, by *Custome*, hath beene made more easie: The *Brooking* of Enormous *Quantity* of *Meats*, and so of *Wine* or *Strong Drinke*, hath beene, by *Custome*, made to be without *Surfet*, or *Drankennesse*. And generally *Diseases* that are *Chronicall*, as *Coughes*, *Phthisickes*, some kinds of *Palsies*, *Lunacies*, &c. are most dangerous at the first: Therefore a wise *Physitian* will consider whether a *Disease* be Incurable; Or whether the Iust Cure of it be not full of perill; And if hee finde it to bee such, let him resort to *Palliation*; And allenuiate the *Symptome*, without busying himselfe too much with the perfect Cure: And many times, (if the *Patient* be indeed patient) that Course will exceed all Expectation. Likewise the *Patient* himselfe may strue, by little and little, to Overcome the *Symptome*, in the Exacerbation, and so, by time, turne Suffering into Nature.

Experiment
Solitary tou-
ching Cure by
Excesse.

62

Diuers *Diseases*, especially *Chronicall* (such as *Quartan Agues*;) are sometimes cured by *Surfet*, and *Excesses*; As *Excesse of Meat*, *Excesse of Drinke*, *Extraordinary Fasting*, *Extraordinary Stirring*, or *Lassitude*, and the like. The Cause is, for that *Diseases* of *Continuance* get an *Aduentitious Strength* from *Custome*, besides their *Materiall Cause* from the *Humours*: So that the *Breaking* of the *Custome* doth leaue them only to their first *Cause*; which if it be any thing weake will fall off. Besides, such *Excesses* do Excite and Spur *Nature*, which thereupon riseth more forcibly against the *Disease*.

Experiment
Solitary tou-
ching Cure by
Motion of Con-
sent.

63

Here is in the Body of Man a great *Consent* in the *Motion* of the seuerall Parts. We see, it is Childrens sport, to proue whether they can rub vpon their Brest with one hand, and pat vpon their Fore-head with another; And straight-waies, they shall sometimes rub with both Hands, or pat with both hands. We see, that when the Spirits, that come to the Nosthrils, expell a bad Sent, the Stomach is ready to Ex-
pell

pell by Vomit. We finde that in *Consumptions* of the *Lungs*, when Nature cannot expell by *Cough*, Men fall into *Fluxes* of the *Belly*, and then they die. So in *Pestilent Diseases*, if they cannot be expelled by *Sweat*, they fall likewise into *Loosenesse*, and that is commonly Mortall. Therefore *Physitians* should ingeniously contriue, how by *Motions* that are in their *Power*, they may excite *Inward Motions* that are not in their *Power*, by *Consent*: As by the *Stench* of *Feathers*, or the like, they cure the *Rising* of the *Mother*.

Hippocrates *Aphorisme*, In *Morbis minus*, is a good profound *Aphorisme*. It importeth, that *Diseases*, contrary to the *Complexion*, *Age*, *Sex*, *Season of the yeere*, *Diet*, &c. are more dangerous, than those that are *Concurrent*. A man would thinke it should be otherwise; For that, when the *Accident of Sicknesse*, and the *Naturall Disposition*, doe second the one the other, the *Disease* should be more forcible: And so (no doubt) it is; if you suppose like *Quantity of Matter*. But that, which maketh good the *Aphorisme*, is; Because such *Diseases* doe shew a greater *Collection of Matter*, by that they are able to overcome those *Naturall Inclinations* to the *Contrary*. And therefore in *Diseases* of that kinde, let the *Physitian* apply himselfe more to *Purgation*, than to *Alteration*; Because the Offence is in the *Quantity*; and the *Qualities* are rectified of themselves.

Phytians doe wisely prescribe, that there be *Preparatives* vsed before *Iust Purgations*; For certaine it is, that *Purgers* doe many times great Hurt, if the *Body* be not accommodated, both before and after the *Purging*. The Hurt that they doe, for want of *Preparation* before *Purging*, is by the *Sticking* of the *Humours*, and their not comming faire away; Which causeth in the *Body* great *Perturbations*, and ill *Accidents*, during the *Purging*; And also, the diminishing, and dulling of the *Working* of the *Medicine* it selfe, that it purgeth not sufficiently. Therefore the worke of *Preparation* is double; To make the *Humours* *fluide*, and mature; And to make the *Passages* more open: For both those helpe to make the *Humours* passe readily. And for the former of these, *Sirrups* are most profitable; And for the Latter, *Apozumes*, or *Preparing Broths*; *Clisters* also helpe, lest the *Medicine* stop in the *Guts*, and worke gripingly. But it is true, that *Bodies abounding* with *Humours*; And *fat Bodies*; And *Open weather*; are *Preparatives* in themselves; because they make the *Humours* more *fluide*. But let a *Physitian* beware, how he purge after hard *Frosty Weather*, and in a *Leane Body*, without *Preparation*. For the Hurt, that they may doe after *Purging*; It is caused by the *Lodging* of some *Humours* in ill *Places*: For it is certaine, that there be *Humours*, which somewhere placed in the *Body*, are quiet, and doe little hurt; In other *Places* (especially *Passages*) doe much mischief. Therefore it is good, after *Purging*, to vse *Apozumes*, and *Broths*, not so much *Opening* as those vsed before *Purging*, but *Abstersiue* and

Experiment
Solitary touching Cure of
Diseases which
are contrary to
Predisposition.

64

Experiment
Solitary touching Preparations before
Purging, and setting of the
Body afterward.

65

Mundifying Clifters also are good to conclude with, to draw away the Reliques of the Humours, that may haue descended to the *Lower Region* of the Body.

Experiment
Solitary touch-
ing Stanch-
ing of Bloud.

66

Blood is stanch'd diuers waies. First by *Astringents*, and *Repercussive Medicines*. Secondly, by *Drawing* of the *Spirits* and *Bloud inwards*; which is done by *Cold*; As *Iron*, or a *Stone* laid to the neck doth stanch the Bleeding at the Nose; Also it hath beene tried, that the *Testicles*, being put into sharpe Vinegar, hath made a sudden *Recess* of the *Spirits*, and stanch'd *Bloud*. Thirdly, by the *Recess* of the *Bloud* by *Sympathy*. So it hath beene tried, that the part that bleedeth, being thrust into the Body of a Capon, or Sheepe, new ript and bleeding, hath stanch'd *Bloud*; The *Bloud*, as it seemeth, sucking and drawing vp, by similitude of substance, the *Bloud* it meeteth with, and so it selfe going backe. Fourthly by *Custom* and *Time*; So the Prince of *An-
range*, in his first hurt, by the *Spanish Boy*, could find no meanes to stanch the *Bloud*, either by *Medicine* or *Ligament*; but was faine to haue the *Ori-
fice* of the *Wound* stopped by *Mens Thumbs*, succeeding one another, for the space at least of two Daies; And at the last the bloud by *Custom* only retired. There is a fifth Way also in vse, to let *Bloud* in an *Adverse Part*, for a *Revulsion*.

Experiment
Solitary touch-
ing Change of
Aliments and
Medicines.

67

IT helpeth, both in *Medicine*, and *Aliment*, to Change and not to continue the same *Medicine*, and *Aliment* still. The Cause is, for that *Nature* by continuall Vse of any Thing, groweth to a *Satiety*, and *Dulnesse*, either of *Appetite*, or *Working*. And we see that *Assuetude* of *Things Hurt-
full* doth make them leese their force to Hurt; As *Poison*, which with vse some haue brought themselues to brooke. And therefore it is no mar-
uell, though *Things helpfull*, by *Custom*, leese their force to Helpe. I count *Intermission* almost the same thing with *Change*; For that, that hath beene intermitted, is after a sort new.

Experiment
Solitary touch-
ing Diets.

68

IT is found by Experience, that in *Diets* of *Guaiaicum*, *Sarza*, and the like (especially if they be strict) the *Patient* is more troubled in the beginning, than after continuance; which hath made some of the more delicate Sort of patients, giue them ouer in the midst; Supposing that if those *Diets* trouble them so much at first, they shall not be able to endure them to the End. But the Cause is, for that all those *Diets*, doe dry vp *Humors*, *Rheumes*, and the like; And they cannot Drie vp vntill they haue first attenuated; And while the *Humour* is attenuated, it is more Fluid, than it was before, and troubleth the Body a great deale more, vntill it be dried vp, and consumed. And therefore *Patients* must expect a due time, and not checke at them at the first.

Experiments
in Consort
touching the
Production of
Cold.

The Producing of *Cold* is a thing very worthy the Inqui-
sition; both for Vse, and Disclosure of Causes. For *Heat* and
Cold

Cold are *Natures* two Hands, whereby shee chiefly worketh: And *Heat* we haue in readinesse, in respect of the *Fire*; But for *Cold* we must stay till it commeth; or seeke it in deepe Caues, or high Mountaines: And when all is done, we cannot obtaine it in any great degree: For *Furnaces* of *Fire* are farre hotter, than a *Summers Sunne*; But *Vaults*, or *Hils* are not much Colder than a *Winters Frost*.

The first *Meanes* of *Producing Cold*, is that which *Nature* presenteth vs withall; Namely the *Expiring of Cold* out of the *Inward Parts* of the *Earth* in *Winter*, when the *Sun* hath no power to ouercome it; the *Earth* being (as hath been noted by some) *Primum Frigidum*. This hath beene asserted, as well by *Ancient* as by *Moderne Philosophers*: It was the Tenet of *Parmenides*. It was the opinion of the *Author* of the discourse in *Plutarch* (for I take it that Booke was not *Plutarchs* owne) *De primo Frigido*. It was the opinion of *Telesius*, who hath renewed the *Philosophy* of *Parmenides*, and is the best of the *Nouellists*.

The Second *Cause* of *Cold* is the *Contact* of *Cold Bodies*; For *Cold* is *Active* and *Transitive* into *Bodies* *Adiacent*, as well as *Heat*: which is seene in those things that are touched with *Snow* or *Cold water*. And therefore, whosoever will be an *Inquirer* into *Nature*, let him resort to a *Conseruatory* of *Snow* and *Ice*; Such as they vse for delicacy, to coole *Wine* in *Summer*: Which is a *Poore* and *Contemptible* vse, in respect of other vses, that may be made of such *Conseruatories*.

The Third *Cause* is the *Primary Nature* of all *Tangible bodies*: For it is well to be noted, that all Things whatsoever (*Tangible*) are of themselves *Cold*; Except they haue an *Accessory Heat* by *fire*; *Life*; or *Motion*: For euen the *Spirit* of *Wine*, or *Chymicall Oiles*, which are so hot in *Operation*, are to the first Touch *Cold*; And *Aire* it selfe compressed, and *Condensed* a little by blowing, is *Cold*.

The Fourth *Cause* is the *Density* of the *Body*; For all *Dense Bodies* are *Colder* than most other *Bodies*; As *Metals*, *Stone*, *Glasse*; And they are longer in *Heating* than *Softer Bodies*. And it is certaine, that *Earth*, *Dense*, *Tangible*, hold all of the *Nature* of *Cold*. The *Cause* is, for that all *Matters Tangible* being *Cold*, it must needs follow, that where the *Matter* is most *Congregate*, the *Cold* is the greater.

The Fifth *Cause* of *Cold*, or rather of increase and vehemence of *Cold*, is a *Quicke Spirit* inclosed in a *Cold Body*: As will appeare to any that shall attentively consider of *Nature* in many Instances. We see *Nitre* (which hath a *Quicke Spirit*) is *Cold*; more *Cold* to the *Tongue*, than a *Stone*; So *Water* is *Colder* than *Oile*, because it hath a *Quicker Spirit*; For all *Oile*, though it hath the *Tangible Parts* better digested than *Water*, yet hath it a duller *Spirit*: So *Snow* is *Colder* than *Water*, because it hath more *Spirit* within it: So we see that *Salt* put to *Ice* (as in the producing of the *Artificiall Ice*) increaseth the *Activity* of *Cold*: So some *Insect* which haue

Spirit of Life, as *Snakes*, and *Silkewormes*, are, to the touch, *Cold*. So *Quick-silver* is the *Coldest* of *Mettals*, because it is *fullest of Spirit*.

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The *Sixth Cause of Cold* is the *Chasing and Driving away of Spirits*, such as haue some *Degree of Heat*: For the *Banishing of the Heat* must needs leaue any *Body Cold*. This we see in the *Operation of Opium*, and *Stupratives*, vpon the *Spirits of liuing Creatures*: And it were not amisse to try *Opium*, by laying it vpon the *Top of a Weather-glasse*, to see whether it will contract the *Aire*: But I doubt it will not succeed: For besides that the vertue of *Opium* will hardly penetrate thorow such a *Body as Glasse*, I conceiue that *Opium*, and the like, make the *Spirits* flie rather by *Malignity*, than by *Cold*.

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Seuenthly, the same *Effect* must follow vpon the *Exhaling* or *Drawing out of the warme Spirits*, that doth vpon the *Flight of the Spirits*. There is an *Opinion*, that the *Moone* is *Magneticall of Heat*, as the *Sun* is of *Cold* and *Moisture*: It were not amisse therefore to try it, with *Warme waters*; The one exposed to the *Beames of the Moone*; the other with some *Skreen* betwixt the *Beames of the Moone* and the *Water*; As we vse to the *Sunne* for *Shade*; And to see whether the former will coole sooner. And it were also good to enquire, what other *Meanes* there may be, to draw forth the *Exile heat*, which is in the *Aire*; for that may be a *Secret of great Power* to *Produce Cold weather*.

Experiments
in Consort
touching the
Version and
Transmutation
of Aire into Wa-
ter.

We haue formerly set downe the *Meanes of turning Aire into water*, in the *Experiment 27*. But because it is *Magnale Nature*; And tendeth to the subduing of a very great effect; And is also of *Manifold vse*; we will adde some *Instances in Consort* that giue light thereunto.

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It is reported by some of the *Ancients*, that *Sailers* haue vsed, euery Night, to hang *Fleeces of wooll* on the sides of their *Ships*, the *Wooll* towards the water; And that they haue crushed fresh *Water* out of them, in the Morning, for their vse. And thus much wee haue tried, that a *Quantity of Wooll* tied loose together, being let downe into a deepe *Well*; And hanging in the *Middle*, some three *Fathome* from the water, for a night, in the *Winter time*; increased in weight, (as I now remember) to a fifth Part.

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It is reported by one of the *Ancients*, that in *Lydia*, neere *Pergamus*, there were certaine *Work-men*, in time of *Warres*, fled into *Caves*; And the Mouth of the *Caves* being stopped by the *Enemies*, they were famished. But long time after the dead *Bones* were found; And some *Vessels* which they had carried with them; And the vessels full of *Water*; And that *Water*, thicker, and more towards *Ice*, than *Common Water*: which is a *Notable Instance of Condensation*, and *Induration*, by *Buriall vnder Earth*, (in *Caves*) for long time; And of *version* also (as it should seeme) of *Aire into Water*; if any of those vessels were *Emptie*. Trie therefore a small *Bladder* hung in *Snow*; And the like in *Nitre*; And the like

like in *Quick-silver*: And if you finde the *Bladders* fallen, or shrunkes; you may be sure the *Aire* is condensed by the *Cold* of those *Bodies*; As it would be in a *Cave* vnder *Earth*.

It is reported of very good credit, that in the *East Indies*, if you set a Tub of *Water* open, in a Roome where *Clones* are kept, it will be drawne drie in foure and twenty houres; Though it stand at some distance from the *Clones*. In the Countrey, they vse many times, in deceit, when their *wooll* is new shorne, to set some *Pailes* of *Water* by, in the same Roome; to increase the weight of the *wooll*: But it may be, that the Heat of the *wooll*, remaining from the body of the *Sheepe*; or the Heat gathered by the lying close of the *wooll*, helpeth to draw the watry Vapour; But that is nothing to the *Version*.

It is Reported also credibly, that *wooll* new shorne, being laid casually vpon a *Vessell* of *Veriuyce*, after some time, had drunke vp a great part of the *Veriuyce*, though the *Vessell* were whole without any *Flaw*, and had not the Bung-hole open. In this *Instance*, there is (vpon the by) to be noted, the *Percolation*, or *Suing* of the *Veriuyce* thorow the wood; For *Veriuyce* of it selfe would neuer haue passed thorow the wood: So as, it seemeth, it must be first in a kinde of Vapour, before it passe.

It is especially to be noted, that the Cause, that doth facilitate the *Version* of *Aire* into *Water*, when the *Aire* is not in grosse, but subtilly mingled with *Tangible Bodies*, is, (as hath beene partly touched before,) for that *Tangible Bodies* haue an Antipathy with *Aire*; And if they finde any *Liquid Body*, that is more dense, neare them, they will draw it: And after they haue drawne it, they will condense it more, and in effect incorporate it; For we see that a *Sponge*, or *wooll*, or *Sugar*, or a *woollen cloth*, being put but in part, in *Water*, or *Wine*, will draw the *Liquor* higher, and beyond the place, where the *Water* or *Wine* commeth. We see also, that *Wood*, *Lute-strings*, and the like, doe swell in *moist Seasons*: As appeareth by the *Breaking* of the *Strings*, the *Hard Turning* of the *Pegs*, and the *Hard drawing forth* of *Boxes*, and *Opening* of *Wainscot doores*; which is a kinde of *Insufion*: And is much like to an *Insufion* in water, which will make wood to swell: As we see in the *Filling* of the *Chops* of *Boules*, by laying them in water. But for that part of these *Experiments*, which concerneth *Attraction*; we will reserue it to the proper Title of *Attraction*.

There is also a *Version* of *Aire* into water, scene in the *Sweating* of *Marbles*, and other *Stones*. And of *Wainscot* before and in moist weather: This must be, either by some *Moisture* the Body yeeldeth; Or else by the Moist *Aire* thickned against the hard body. But it is plaine, that it is the latter; For that we see *Wood painted with Oyle Colour*, will sooner gather droppes in a moist Night, than *Wood* alone: which is caused by the Smoothnesse and Closenesse; which letteth in no part of the Vapour, and so turneth it backe, and thickeneth it into Dew. We see also, that *Breathing* vpon a *Glasse*, or Smooth body, giueth a Dew; And in *Frosty Mornings* (such as we call *Rime frosts*) you shall finde drops of Dew vpon
the

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the Inside of Glasse-windowes; And the *Frost* it selfe vpon the ground is but a *Version* or *Condensation*, of the Moist vapours of the Night, into a watric substance: *Dewes* likewise, and *Raine*, are but the Returnes of Moist vapours Condensed; The Dew, by the *Cold* only of the Sunnes departure, which is the gentler *Cold*; *Raines*, by the *Cold* of that, which they call the *Middle Region* of the *Aire*; which is the more violent *Cold*.

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It is very probable (as hath beene touched) that that, which will turne *Water* into *Ice*, will likewise turne *Aire* Some Degree nearer vnto *Water*. Therefore trie the *Experiment* of the *Artificiall Turning water into Ice* (whereof we shall speake in another place) with *Aire* in place of *Water*, and the *Ice* about it. And although it be a greater Alteration to turne *Aire* into *Water*, than *Water* into *Ice*: yet there is this Hope, that by Continuing the *Aire* longer time, the effect will follow; For that *Artificiall Conuerſion* of *Water* into *Ice*, is the worke of a few Houres; And this of *Aire* may be tried by a Moneths space, or the like.

Experiments
in Conſort,
touching Indu-
ration of Bodies.

Induration, or *Lapidification*, of Subſtances more ſoft, is likewise another degree of *Condensation*; And is a great *Alteration* in Nature. The Effecting and Accelerating thereof is very worthy to be inquired. It is effected by three Meanes. The firſt is by *Cold*; whose Property is to *Condense*, and conſtigate, as hath beene ſaid. The Second is by *Heat*; which is not proper, but by conſequence; For the *Heat* doth attenuate; And by Attenuation doth ſend forth the Spirit and moiſter Part of a Body; And vpon that, the more groſſe of the Tangible Parts doe contract and ſerre themſelues together; Both to Auoid *Vacuum* (as they call it;) And alſo to Munit themſelues againſt the Force of the *Fire*, which they haue ſuffered. And the Third is by *Aſſimilation*; when a Hard Body Aſſimilateth a Soft, being contiguous to it.

The Examples of *Induration*, taking them promiſcuouſly, are many: As the Generation of *Stones* within the Earth, which at the firſt are but Rude Earth, or Clay: And ſo of *Mineralls*, which come (no doubt) at firſt, of Iuyces Concrete, which afterward indurate: And ſo of *Porcellane*, which is an *Artificiall Cement*, buried in the earth a long time: And ſo the Making of *Bricke*, and *Tile*: Alſo the Making of *Glasse*, of a certaine Sand, and Brake-Roots, and ſome other Matters: Alſo the *Exudations* of *Rock-Diamonds*, and *Crystall*, which harden

den with time: Also the *Induration* of *Bead-Amber*, which at first is a soft Substance; As appeareth by the *Flies*, and *Spiders*, which are found in it; And many more: But wee will speake of them distinctly.

For *Indurations* by *Cold*, there be few *Trialls* of it; For we haue no strong or intense *Cold* here on the Surface of the *Earth*, so neare the Beames of the *Sunne*, and the *Heauens*. The likeliest *Triall* is by *Snow*, and *Ice*; For as *Snow* and *Ice*, especially being holpen, and their *Cold* actuated by *Nitre*, or *Salt*, will turne *Water* into *Ice*, and that in a few houres; So it may be, it will turne *Wood*, or *Stiffe Clay*, into *Stone*, in longer time. Put therefore, into a *Conseruing Pit* of *Snow*, and *Ice*, (adding some quantitie of *Salt*, and *Nitre*,) a Peece of *Wood*, or a Peece of *Tough Clay*, and let it lye a Moneth, or more.

Another *Triall* is by *Metalline Waters*, which haue virtuall *Cold* in them. Put therefore *Wood*, or *Clay*, into *Smiths Water*, or other *Metalline Water*; And try wheether it will not harden in some reasonable time. But I vnderstand it, of *Metalline Waters*, that come by *Washing*, or *Quenching*; And not of *Strong Waters* that come by dissolution; for they are too *Corrosiue* to consolidate.

It is already found, that there are some *Naturall Spring-waters*, that will *Inlapidate Wood*; So as you shall see one peece of *Wood*, whereof the Part aboue the *Water* shall continue *Wood*; and the Part vnder the *Water* shall be turned into a kinde of *Granelly Stone*. It is likely those *Waters* are of some *Metalline Mixture*; But there would be more particular *Inquiry* made of them. It is certaine, that an *Egge* was found, hauing lien many yeeres in the bottome of a *Moat*, where the *Earth* had somewhat ouer-growne it; And this *Egge* was come to the *Hardnesse* of a *Stone*; And had the Colours of the white and yolke perfect: And the Shell shining in small graines like *Sugar*, or *Alabaster*.

Another Experience there is of *Induration* by *Cold*, which is already found; which is, that *Metalls*, themselves are hardened by often *Heating* and *Quenching* in *Cold Water*: For *Cold* euer worketh most potently vpon *Heat* precedent.

For *Induration* by *Heat*, it must be considered, that *Heat*, by the Exhaling of the *Moister Parts*, doth either harden the *Body*; As in *Brickse*, *Tiles*, &c. Or if the *Heat* be more fierce, maketh the grosser part it selfe, Runne and Melt; As in the making of ordinary *Glasse*; And in the *Vitrification* of *Earth*, (As we see in the Inner Parts of *Furnaces*;) and in the *Vitrification* of *Bricke*; And of *Metalls*, And in the former of these, which is the *Hardening* by baking, without Melting, the *Heat* hath these degrees; First it *Indurates*; and then maketh *Fragile*; And lastly it doth *Incinerate* and *Calcinate*.

But if you desire to make an *Induration* with *Toughnesse*, and lesse *Fragilitie*; A middle way would be taken; Which is that which *Aristotle* hath well noted; But would be thoroughly verified. It is, to decoct *Bodies*

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in

in *Water*, for two or three dayes; But they must be such Bodies, into which the *Water* will not enter; As *Stone*, and *Metall*. For if they be Bodies into which the *Water* will enter, then long *Seething*, will rather Soften than indurate them. As hath beene tried in *Egges* &c. Therefore, Softer *Bodies* must be put into *Bottles*; And the *Bottles* hung into *Water* seething, with the mouths open, aboue the *Water*; that no *Water* may get in; For by this Meanes, the virtuall *Heat* of the *Water* will enter; And such a *Heat*, as will not make the Bodie adust, or fragile; But the Substance of the *Water* will be shut out. This *Experiment* wee made; And it sorted thus. It was tried with a Peece of *Free-stone*, and with *Pewter*, put into the *Water* at large. The *Free-stone* we found receiued in some *Water*; For it was softer, and easier to scrape, than a peece of the same *Stone* kept drie. But the *Pewter* into which no *Water* could enter, became more white, and liker to *Siluer*, and lesse flexible, by much. There were also put into an Earthen Bottle, placed as before, a good Pellet of *Clay*, a Peece of *Cheese*, a Peece of *Chalke*, and a Peece of *Free-stone*. The *Clay* came forth almost of the Hardnesse of *Stone*. The *Cheese* likewise very hard, and not well to be cut: The *Chalke* and the *Free-stone* much harder than they were. The colour of the *Clay* inclined not a whit to the Colour of *Bricke*, but rather to *White*, as in ordinary *Drying* by the *Sunne*. Note, that all the former *Trialls* were made by a *Boyling* vpon a good hot *Fire*, renewing the *Water* as it consumed, with other hot *Water*; But the *Boyling* was but for twelue houres onely; And it is like that the *Experiment* would haue beene more effectually, if the *Boyling* had beene for two or three dayes, as we prescribed before.

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As touching *Assimilation*, (for there is a degree of *Assimilation* euen in Inanimate bodies) we see Examples of it in some *Stones* in *Clay-grounds*, lying neare to the top of the *Earth*, where *Pebble* is; In which you may manifestly see diuers *Pebbles* gathered together, and a Crust of *Cement* or *Stone* betweene them, as hard as the *Pebbles* themselues: And it were good to make a *Triall* of purpose, by taking *Clay*, and putting in it diuers *Pebble-Stones*, thicke set, to see whether in continuance of time, it will not be harder than other *Clay* of the same lump, in which no *Pebbles* are set. We see also in *Ruines* of old *Walls*, especially towards the bottome, the *Mortar* will become as hard as the *Bricke*; we see also, that the *Wood* on the sides of *Vessels* of *Wine*, gathereth a Crust of *Tartar*, harder than the *Wood* it selfe; And *Scales* likewise grow to the *Teeth*, harder than the *Teeth* themselues.

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Most of all, *Induration* by *Assimilation* appeareth in the Bodies of *Trees*, and *living Creatures*: For no *Nourishment* that the *Tree* receiueeth, or that the *living Creature* receiueeth, is so hard as *Wood*, *Bone*, or *Horne*, &c. but is *Indurated* after by *Assimilation*.

Experiment
Solitary touch-
ing the Ver-
sion of Water into
Aire.

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THE eie of the vnderstanding, is like the eie of the Sense: For as you may see great Objects thorow small Crannies, or Leuells; So you may

may see great *Axiomes* of *Nature*, through small and Contemptible *Instances*. The *Speedy Depredation* of *Aire* vpon *watry Moisture*, and *Version* of the same into *Aire*, appeareth in nothing more visible, than in the sudden Discharge, or vanishing, of a little *Cloud* of *Breath*, or *Vapour*, from *Glasse*, or the *Blade* of a *Sword*, or any such Polished Body; Such as doth not at all Detaine, or Imbibe the Moisture; For the Mistinesse scattereth and breaketh vp suddenly. But the like *Cloud*, if it were *Oyle*, or *Fattie*, will not discharge; Not because it sticketh faster; But because *Aire* preyeth vpon *Water*; And *Flame*, and *Fire*, vpon *Oyle*; And therefore, to take out a Spot of Grease, they vse a *Coale* vpon browne Paper; Because *Fire* worketh vpon Grease, or *Oyle*, as *Aire* doth vpon *Water*. And we see *Paper* oyled, or *Wood* oyled, or the like, last long moist: but *Wet* with *Water*, drie, or putrifie sooner. The Cause is, for that *Aire* meddeth little with the *Moisture* of *Oyle*.

There is an Admirable demonstration, in the same trifling *Instance* of the little *Cloud* vpon *Glasse*, or *Gemmes*, or *Blades* of *Swords*, of the *Force* of *Vnion*, euen in the least *Quantities*, and weakest Bodies, how much it Conduceth to Preservation of the present Forme; And the Resisting of a New. For marke well the discharge of that *Cloud*; And you shall see it euer breake vp, first in the Skirts, and last in the midst. We see likewise, that much *Water* draweth forth the Iuyce of the Body Infused; But little water, is imbibed by the Body: And this is a Principall Cause, why in Operation vpon Bodies, for their *Version* or *Alteration*, the Triall in great Quantities, doth not answer the Triall in small; And so deceiueth many; For that (I say) the greater Body, resisteth more any *Alteration* of Forme, and requireth far greater Strength in the *Actiue* Body, that should subdue it.

We haue spoken before in the fifth *Instance*, of the Cause of *Orient Colours*, in *Birds*; which is by the Fineness of the Strainer; we will now endeouour to reduce the same *Axiome* to a *Work*. For this Writing of our *Sylua Sylvarum*, is (to speake properly) not *Naturall History*, but a high kinde of *Naturall Magicke*. For it is not a Description only of Nature, but a Breaking of Nature, into great and strange Workes. Trye therefore, the Anointing ouer of *Pigeons*, or other *Birds*, when they are but in their downe; Or of *Whelpes*, cutting their Haire as short as may be; Or of some other Beast; with some oyntment, that is not hurtfull to the Flesh; And that will harden, and sticke very close; And see whether it will not alter the Colours of the *Feathers*, or *Haire*. It is receiued, that the *Pulling* off, the first *Feathers* of *Birds*, cleanly will make the new come forth *White*. And it is certaine, that *White* is a penurious Colour, and where Moisture is scant. So *Blew Violets*, and other *Flowers*, if they be starued, turne *Pale* and *White*; *Birds*, and *Horses*, by Age, or Scarres, turne *White*: And the *Hoare Haires* of Men, come by the same reason. And therefore in *Birds*, it is very likely, that the *Feathers* that

Experiment
Solitary touching the Force
of *Vnion*.

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Experiment
Solitary touching the Producing of Feathers and Haires
of diuers Colours.

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come first, will be many times of diuers Colours, according to the Nature of the *Bird*; For that the Skin is more porous; But when the Skin is more shut, and close, the Feathers will come *White*. This is a good *Experiment*, not only for the producing of *Birds*, and *Beasts* of strange Colours; but also for the Disclosure of the Nature of *Colours* themselves; which of them require a finer Porositie, and which a grosser.

Experiment
Solitary touch-
ing the Nour-
ishment of Li-
ving Creatures
before they be
brought forth.

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IT is a worke of Prouidence, that hath beene truly obserued by some; That the *Tolke* of the *Egge*, conduceth little to the *Generation* of the *Bird*; But only to the *Nourishment* of the same: For if a *Chicken* be opened, when it is new hatched; you shall finde much of the *Tolke* remaining. And it is needfull, that *Birds*, that are shaped without the *Females* *Wombe*; haue in the *Egge*, as well Matter of Nourishment, as Matter of generation for the Body. For after the *Egge* is laid, and seuered from the Body of the *Hen*; It hath no more Nourishment from the *Hen*; But only a quickening *Heat* when shee sitteth. But *Beasts*, and *Men* need not the matter of Nourishment within themselves; Because they are shaped within the *Wombe* of the *Female*, and are nourished continually from her Body.

Experiments
in Confort,
touching Sym-
pathy and Anti-
pathy for Medi-
cinall use.

95

IT is an Inueterate and receiued Opinion, that *Camtharides* applied to any part of the Body, touch the *Bladder*, and exulcerate it, if they stay on long. It is likewise Receiued, that a kinde of *Stone*, which they bring out of the *West Indies*, hath a peculiar force to moue *Grauell*, and to dissolue the *Stone*; In so much, as laid but to the wrest, it hath so forcibly sent downe *Grauell*, as *Men* haue beene glad to remoue it; It was so violent.

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It is receiued and confirmed by daily Experience, that the *Soales* of the *Feet* haue great Affinitie with the *Head*, and the *Mouth* of the *Stomacke*: As we see, *Going wet-shod*, to those that vse it not, affecteth both: Applications of *hot Powders* to the *Feet* attenuate first, and after dry the *Rheume*: And therefore a *Physitian*, that would be Mysticall, prescribeth, for the Cure of the *Rheume*, that a *Man* should walke Continually vpon a *Camomill Alley*; Meaning, that he should put *Camomill* within his *Sockes*. Likewise *Pigeons bleeding*, applyed to the *Soales* of the *Feet*, ease the *Head*: And *Soporiferous Medicines* applied vnto them, prouoke *Sleepe*.

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It seemeth, that as the *Feet* haue a Sympathy with the *Head*; So the *Wrists* and *Hands*, haue a Sympathy with the *Heart*; We see the Affeets and Passions of the *Heart*, and *Spirits*, are notably disclosed by the *Pulse*: And it is often tried, that Iuyces of *Stock-Gilly-Flowers*, *Rose-Campian*, *Garlicke*, and other things; applied to the *Wrists*, and renewed; haue cured long *Agues*. And I conceiue, that washing with certaine *Liquors*, the *Palmes* of the *Hands*, doth much good: And they doe well in *Heats* of *Agues*, to hold in the *Hands*, *Egges of Alabaster*, and *Balls of Crystall*.

Of these things we shall speake more, when we handle the Title of Sympathy and Antipathy, in the proper Place.

The

The Knowledge of man (hitherto) hath beene determined by the View, or Sight; So that whatsoever is Inuisible, either in respect of the *Finenesse of the Body* it selfe; Or the *Smalnesse of the Parts*; Or of the *Subtily of the Motion*; is little inquired. And yet these be the Things that Gouverne Nature principally; And without which, you cannot make any true *Analysis* and Indication of the Proceedings of Nature. The *Spirits* or *Pneumatics*, that are in all *Tangible Bodies*, are scarce knowne. Sometimes they take them for *Vacuum*; whereas they are the most Active of Bodies. Sometimes they take them for *Aire*; From which they differ exceedingly, as much as Wine from Water; And as Wood from Earth. Sometimes they will haue them to be *Naturall Heat*, or a *Portion of the Element of Fire*; Whereas some of them are crude and cold. And sometimes they will haue them to be the *Vertues* and *Qualities* of the *Tangible Parts*, which they see; whereas they are Things by themselves. And then, when they come to Plants and liuing Creatures, they call them *Soules*. And such Superficial Speculations they haue; Like Prospective, that shew things inward, when they are but Paintings. Neither is this a Question of Words, but infinitely materiall in Nature. For *Spirits* are nothing else but a *Naturall Body*, rarified to a Proportion, and included in the *Tangible Parts* of Bodies, as in an Integument. And they be no lesse differing one from the other, than the *Dense* or *Tangible Parts*: And they are in all *Tangible Bodies* whatsoever, more or lesse: And they are neuer (almost) at rest: And from them, and their *Motions*, principally proceed *Arefaction*, *Colliquation*, *Concoction*, *Maturation*, *Putrefaction*, *Vinification*, and most of the Effects of Nature: For, as we haue figured them in our *Sapientia Veterum*, in the Fable of *Proserpina*, you shall in the Infernall Regiment heare little Doings of *Pluto*, but most of *Proserpina*: For *Tangible Parts* in Bodies are Stupide things; And the *Spirits* doe (in effect) all. As for the differences of *Tangible Parts* in Bodies, the industry of the *Chymists* hath giuen some light, in discerning by their Separations, the *Oily*, *Crude*, *Pure*, *Impure*, *Fine*, *grosse Parts* of Bodies, and the like. And the *Physicians* are content to acknowledge, that *Herbs*, and *Drugs* haue diuers Parts; As that *Opium* hath a *Stupescative* Part, and a *Heating* Part; The one mouing Sleepe, the other a Sweat following; And that *Rubarb* hath *Purging* Parts, and *Astringent* Parts, &c. But this whole *Inquisition* is weakly and Negligently handled. And for the more subtill differences of the *Minute Parts*, and the Posture of them in the Body, (which also hath great Effects) they are not at all touched: As for the *Motions* of the *Minute Parts* of Bodies, which doe so great Effects, they haue not beene obserued at all, because they are Inuisible, and incurre not to the Eye; but yet they are to be deprehended by Experience: As *Democritus* said well, when they charged him to hold, that the World was made of such little Moats, as were scene in the Sunne; *Atomus* (saith he) *necessitate Rationis & Experientia esse conuincitur; Atomum enim nemo unquam vidit.* And therefore the Tumult in the Parts of Solid Bodies, when they are compressed, which is the Cause of all

Flight of Bodies thorow the Aire, and of other *Mechanicall Motions*, (as hath beene partly rouch'd before, and shall be thoroughly handied in due place) is not seene at all. But neuerthelesse, if you know it not, or enquire it not attentiuely and diligently, you shall neuer be able to discern, and much lesse to produce, a Number of *Mechanicall Motions*. Again, as to the *Motions Corporall*, within the Enclosures of Bodies, whereby the Effects (which were mentioned before) passe between the *Spirits*, and the *Tangible Parts*; (which are, *Arefaction*, *Colligation*, *Concoction*, *Maturation*, &c.) they are not at all handled. But they are put off by the Names of *Vertues*, and *Natures*, and *Actions*, and *Passions*, and such other *Logicall Words*.

Experiment
Solitary tou-
ching the
Power of Heat.

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IT is certaine, that of all *Powers* in *Nature*, *Heat* is the chiefe; both in the Frame of *Nature*, and in the works of *Art*. Certaine it is likewise, that the Effects of *Heat*, are most aduanced, when it worketh vpon a Body, without losse or dissipation of the Matter; for that euer betrayeth the Account. And therefore it is true, that the power of *Heat* is best perceined in *Distillations*, which are performed in close Vessels, and Receptacles. But yet there is a higher Degree; For howsoever *Distillations* doe keepe the Body in Cels, and Cloisters, without Going abroad; yet they giue space vnto Bodies to turne into Vapour; To returne into Liquor; and to Separate one part from another. So as *Nature* doth Expatiate, although it hath not full Liberty: whereby the true and Vltimate Operations of *Heat* are not attained. But if *Bodies* may be altered by *Heat*, and yet no such Reciprocation of *Rarefaction*, and of *Condensation*, and of *Separation*, admitted; then it is like that this *Proteus* of *Matter*, being held by the Sleeues, will turne and change into many *Metamorphoses*. Take therefore a *Square Vessell* of *Iron*, in forme of a Cube, and let it haue good thicke and strong Sides. Put into it a Cube of *Wood*, that may fill it as close as may be; And let it haue a Couer of *Iron*, as strong (at least) as the Sides; And let it be well Luted, after the manner of the *Chymists*. Then place the *Vessell* within burning *Coales*, kept quicke kindled, for some few houres space. Then take the *Vessell* from the *Fire*, and take off the Couer, and see what is become of the *Wood*. I conceiue that since all *Inflammation*, and *Euaporation* are vtterly prohibited, and the *Body* still turned vpon it selfe, that one of these two Effects will follow: Either that the *Body* of the *Wood* will be turned into a kinde of *Amalgama*, (as the *Chymists* call it;) Or that the Finer Part will be turned into *Aire*, and the Grosser sticke as it were baked, and incrustate vpon the Sides of the *Vessell*; being become of a Denfer Matter, than the *Wood* it selfe, Crude. And for another Triall, take also *Water*, and put it in the like *Vessell*, stopped as before; But vse a gentler *Heat*, and remoue the *Vessell* sometimes from the *Fire*; And againe, after some small time, when it is Cold, renue the *Heating* of it: And repeat this *Alteration* some few times: And if you can once bring to passe, that the *Water*, which is one of the Simplest of Bodies, be changed in Colour, Odour, or Taste,

after

after the manner of Compound Bodies, you may be sure that there is a great Worke wrought in Nature, and a Notable Entrance made into strange Changes of Bodies, and productions: And also a Way made, to doe that by Fire, in small time, which the Sunne and Age doe in long time. But of the Admirable Effects of this *Distillation in Close*, (for so we will call it) which is like the *Wombes* and *Matrices* of liuing creatures, where nothing Expirerth, nor Separateth; We will speake fully, in the due place; Not that we Aime at the making of *Paracelsus Pigmeys*; Or any such Prodigious Follies; But that we know the Effects of *Heat* will be such, as will scarce fall vnder the Conceit of Man; If the force of it be altogether kept in.

T Here is nothing more Certain in Nature, than that it is impossible for any *Body*, to be vtterly *Annihilated*; But that, as it was the work of the Omnipotency of *God*, to make *Somewhat* of *Nothing*; So it requirerth the like Omnipotency, to turne *Somewhat* into *Nothing*. And therefore it is well said, by an Obscure Writer of the *Sect* of the *Chymists*; That there is no such way to effect the Strange *Transmutations* of *Bodies*, as to endeavour and vrge by all means, the *Reducing* of them to *Nothing*. And herein is contained also a great Secret of Preservation of Bodies from Change; For if you can prohibit, that they neither turne into *Aire*, because no *Aire* commeth to them; Nor goe into the *Bodies Adjacent*, because they are vtterly Heterogeneall; Nor make a *Round* and *Circulation* within themselues; they will neuer change, though they bee in their Nature neuer so Perishable, or Mutable. We see, how *Flies*, and *Spiders*, and the like, get a *Sepulcher* in *Amber*, more Durable, than the *Monument*, and *Embalming* of the *Body* of any *King*. And I conceiue the like will be of *Bodies* put into *Quick-silver*. But then they must be but thin; As a leafe, or a peece of Paper, or Parchment; For if they haue a greater Crassitude, they will alter in their owne Body, though they spend not. But of this, We shall speake more, when we handle the *Title of Conservation of Bodies*.

Experiment
Solitary touching the
Impossibility of An-
nihilation.

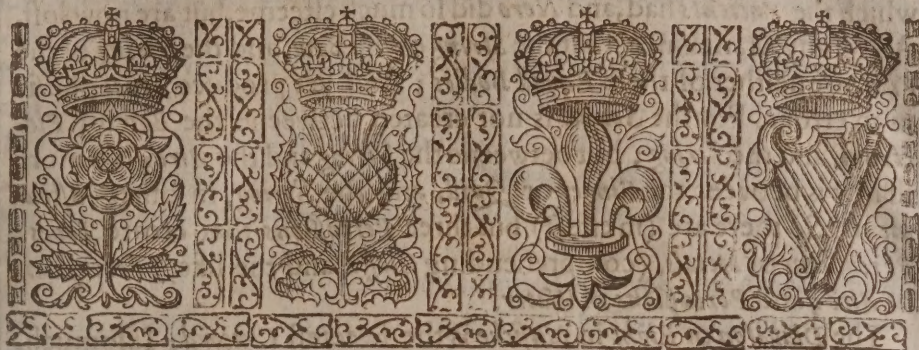
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after the manner of Compound Bodies, you may be sure that there is a great Work wrought in Nature, and a Notable Entrance made into strange Changes of Bodies, and productions: And also a Way made to that by Fire in small time, which the Sun and Age doe in long time. But of the Admirable Effects of this Diffusion in Cells (for so we will call it) which is like the manner and manner of living creatures, where nothing Exceedeth, nor Separateth: We will speak fully in the due place; for that we Aime at the making of Partes in Figure: Or any such Proliferous Follies; But that we know the Effects of what will be done, we will leave fall under the Concept of Man; In the force of it be the better kept in.

There is nothing more Certain in Nature, than that it is impossible for any Body, to be vitally animated; But that as it was the work of the Omnipotent God, to make something of Nothing; So it is required the Omnipotent, to make something into Nothing. And therefore it is well said, by an Obscure Writer of the 2d of the Cyprians: That there is no such way to effect the strange Transmutation of Bodies as to enation and vice by all means the Raising of them to Nothing. And herein is contained also a great Secret of Preservation of Bodies from Change; for if you can prohibit that they neither turne into Air, because no Air cometh to them; Nor goe into the Air, because they are vitally Heterogeneous; Nor make a Rarid and Gaseous within themselves; they will never change, though they bee in such Nature never to Partible, or Mouldable, Water, hot Fire, and Spikes, and the like, are separate in Nature, more Durable, than the Mortal, and Earthly way of the rest of any thing. And I conceive the like will be of Bodies put into Quat. State, but then they must be put thin; As a leaf, or a peck of Paper, or Parchment; For if they have a greater Consistence they will alter in their own. By though they should not But of this We shall speak more when we handle the Title of Conservation of Bodies.

Experiment
Solution
thing the
possibility of the
100

D. NATV



NATVRALL HISTORIE.

II. Century.



MUSICKE in the *Practice*, hath bin well pursued; And in good Variety; But in the *Theory*, and especially in the *Teelding* of the *Caus*es of the *Practique*, very weakly; Being reduced into certaine *My*sticall Subtilties, of no vse, and not much Truth. We shall therefore, after our manner, ioyne the *Contemplatiue* and *Active* Part together.

All *Sounds*, are either *Musical* *Sounds*, which we call *Tones*; Whereunto there may be an *Harmony*; which *Sounds* are euer *Equall*; As *Singing*, the *Sounds* of *Stringed*, and *Wind-Instruments*, the *Ring*ing of *Bels*, &c. Or *Immus*icall *Sounds*; which are euer *Vnequall*; Such as are the *Voice* in *Speaking*, all *Whisperings*, all *Voices* of *Beasts* and *Birds*, (except they be *Singing Birds*;) all *Percussions*, of *Stones*, *Wood*, *Parchment*, *Skins* (as in *Drummes*;) and infinite others.

The *Sounds* that produce *Tones*, are euer from such *Bodies*, as are in their *Parts* and *Pores* *Equall*; As well as the *Sounds* themselues are *Equall*; And such are the *Percussions* of *Metall*, as in *Bels*; Of *Glas*se, as in the *Fil*lipping of a *Drinking Glas*se; Of *Aire*, as in *Mens* *voices* whilest they *Sing*, in *Pipes*, *Whistles*, *Organs*, *Stringed-Instruments*, &c. And of *Water*; as in the *Nightingale-Pipes* of *Regalls*, or *Organs*, and other *Hydranlickes*; which

Experiments
in Confort
touching *Mu-*
sicke,

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which the *Ancients* had, and *Nero* did so much esteeme, but are now lost. And if any Man thinke, that the *String* of the *Bow*, and the *String* of the *Viall*, are neither of them *Equall Bodies*; And yet produce *Tones*; he is in an error. For the *Sound* is not created betweene the *Bow* or *Plectrum*, and the *String*; but betweene the *String* and the *Aire*; No more than it is betweene the *Finger* or *Quill*, and the *String*, in other *Instruments*. So there are (in effect) but three *Percussions* that create *Tones*; *Percussions* of *Metals*, (comprehending *Glasse*, and the like;) *Percussions* of *Aire*; and *Percussions* of *Water*.

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The *Diapason* or *Eight* in *Musicke* is the sweetest *Concord*; Inasmuch, as it is in effect an *Unison*; As we see in *Lutes*, that are strung in the *Base Strings* with two strings, one an *Eight* above another; Which make but as one *Sound*. And every *Eighth Note* in *Ascent* (as from *Eight* to *Fifteene*: from *Fifteene* to *twenty two*, and so in infinitum,) are but *Scales of Diapason*. The *Cause* is darke, and hath not beene rendred by any; And therefore would be better contemplated. It seemeth that *Aire*, (which is the Subiect of *Sounds*) in *Sounds* that are not *Tones* (which are all *unequall*, as hath beene said) admitteth much *Variety*; As we see in the *Voices* of *Living Creatures*; And likewise in the *Voices* of severall *Men*; (for we are capable to discern severall *Men* by their *Voices*;) And in the *Coniugation of Letters*, whence *Articulate Sounds* proceed; Which of all others are most various. But in the *Sounds* which we call *Tones*, (that are ever *Equall*) the *Aire* is not able to cast it selfe into any such variety; But is forced to recurre into one and the same *Posture* or *Figure*, only differing in *Greatnesse* and *Smalnesse*. So we see *Figures* may be made of *lines*, *Crooked* and *Straight*, in infinite *Variety*, where there is *Inequality*; But *Circles*, or *Squares*, or *Triangles Equilaterall* (which are all *Figures*, of *Equall lines*) can differ but in *Greater*, or *Lesser*.

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It is to be noted (the rather lest any Man should thinke, that there is any thing in this *Number of Eight*, to create the *Diapason*) that this *Computation of Eight*, is a thing rather received, than any true *Cōputation*. For a true *Computation* ought ever to be, by *Distribution* into *equall Portions*. Now there be interuenient in the *Rise of Eight* (in *Tones*) two *Beemolls*, or *Halfe-notes*; So as if you diuide the *Tones* equally, the *Eight* is but *seven* whole and equal *Notes*; And if you subdiuide that into *Halfe Notes* (as it is in the *Stops of a Lute*) it maketh the *Number of thirteene*.

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Yet this is true; That in the ordinary *Rises* and *Falls* of the *Voice* of *Man* (not measuring the *Tone* by whole *Notes*, and halfe *Notes*, which is the *Equall Measure*;) there fall out to be two *Beemolls* (as hath beene said) betweene the *Unison* and the *Diapason*: And this *Varying* is naturall. For if a Man would endeavour to raise or fall his *Voice*, still by *Halfe-Notes*, like the *Stops of a Lute*; or by whole *Notes* alone, without *Halves*; as farre as an *Eight*; he will not be able to frame his *Voice* vnto it. Which sheweth, that after euery three whole *Notes* Nature requireth, for all *Harmonicall vse*, one *halfe Note* to be interposed.

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It is to be considered, that whatsoeuer *Vertue* is in *Numbers*, for
Conducing

Conducing to Conccent of *Notes*, is rather to be ascribed to the *Ante-Number*, than to the *Entire Number*; As namely, that the Sound returneth after *Six*, or after *Twelve*; So that the *Seuenth*, or the *Thirteenth*, is not the Matter, but the *Sixth*, or the *Twelfth*; And the *Seuenth* and the *Thirteenth* are but the limits and Boundaries of the *returne*.

The *Concords* in *Musicke* which are *Perfect*, or *Semiperfect*, betweene the *Vnison*, and the *Diapason*, are the *Fifth*, which is the most *Perfect*; the *Third* next; And the *Sixth* which is more harsh: And as the Ancients esteemed, and so doe my selfe and some Other yet, the *Fourth* which they call *Diatessaron*. As for the *Tenth*, *Twelfth*, *Thirteenth*, and so in *infinitum*; they be but *Recurrences* of the Former; viz. of the *Third*, the *Fifth*, and the *Sixth*; being an *Eight* respectiuelly from them.

For *Discords*, the *Second*, and the *Seuenth*, are of all others the most odious, in *Harmony*, to the *Sense*; whereof the One is next about the *Vnison*, the Other next vnder the *Diapason*: which may shew, that *Harmony* requireth a competent distance of *Notes*.

In *Harmony*, if there be not a *Discord* to the *Base*, it doth not disturbe the *Harmony*, though there be a *Discord* to the *Higher Parts*; So the *Discord* be not of the Two that are Odious; And therefore the ordinary *Conccent* of *Four* Parts consisteth of an *Eight*, a *Fifth*, and a *Third* to the *Base*: But that *Fifth* is a *Fourth* to the *Treble*, and the *Third* is a *Sixth*. And the Cause is, for that the *Base* striking more Aire, doth ouercome and drowne the *Treble*, (vnlesse the *Discord* be very Odious;) And so hideth a small Imperfection. For we see, that in one of the *lower Strings* of a *Lute*, there soundeth not the Sound of the *Treble*, nor any *Mixt Sound*, but only the Sound of the *Base*.

We haue no *Musicke* of *Quarter-Notes*; And it may be, they are not capable of *Harmony*; For we see the *Halfe-Notes* themselues doe but interpose sometimes. Neuerthelesse we haue some *Slides*, or *Relishes*, of the *Voyce*, or *Strings*, as it were continued without *Notes*, from one *Tone* to another, rising or falling, which are delightfull.

The Causes of that which is *Pleasing*, or *Ingrate* to the *Hearing*, may receiue light by that, which is *Pleasing* or *Ingrate* to the *Sight*. There be two Things *Pleasing* to the *Sight*, (leauing *Pictures*, and *Shapes* aside, which are but Secondary Obiects; And please or displease but in Memory;) these two are, *Colours*, and *Order*. The *Pleasing* of *Colour* symbolizeth with the *Pleasing* of any *Single Tone* to the *Eare*; But the *Pleasing* of *Order* doth symbolize with *Harmony*. And therefore we see in *Garden-knots*, and the *Frets of Houses*, and all equall and well-answering *Figures*, (as *Globes*, *Pyramides*, *Cones*, *Cylinders*, &c.) how they please; whereas *unequall Figures* are but Deformities. And both these *Pleasures*, that of the *Eye*, and that of the *Eare*, are but the Effects of *Equality*; *Good Proportion*, or *Correspondence*: So that (out of *Question*,) *Equality*, and *Correspondence*, are the Causes of *Harmony*. But to finde the *Proportion* of that *Correspondence*, is more abstruse; whereof notwithstanding we shall speake somewhat, (when we handle *Tones*,) in the generall Enquiry of *Sounds*.

Tones

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Tones are not so apt altogether to procure *Sleep*, as some other *Sounds*; As the *Wind*, the *Purling of Water*, *Humming of Bees*, a *Sweet Voice* of one that readeth, &c. The *Cause* whereof is, for that *Tones*, becaule they are Equall, and slide not, doe more strike and erect the *Sense*, than the other. And Over-much Attention hindereth *Sleepe*.

113

There be in *Musicke* certaine *Figures*, or *Tropes*; almost agreeing with the *Figures* of *Rhetoricke*; And with the *Affections* of the *Minde*, and other *Senses*. First, the *Division* and *Quauering*, which please so much in *Musicke*, haue an Agreement with the *Glittering of Light*; As the *Moone-Beames* playing vpon a *Waue*. Againc, the *Falling* from a *Discord* to a *Concord*, which maketh great *Sweetnesse* in *Musick*, hath an Agreement with the *Affections*, which are reintegrated to the better, after some dislikes: It agreeth also with the *Taste*, which is soone glotted with that which is sweet alone. The *Sliding* from the *Close* or *Cadence*, hath an Agreement with the *Figure* in *Rhetorick*, which they call *Præter Expectatam*; For there is a Pleasure euen in *Being deceived*. The *Reports*, and *Fuges*, haue an Agreement with the *Figures* in *Rhetoricke*, of *Repetition*, and *Traduction*. The *Tripla's*, and *Changing of Times*, haue an Agreement with the *Changes of Motions*; As when *Galliard Time*, and *Measure Time*, are in the *Medley* of one *Dance*.

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It hath beene anciently held, and obserued, that the *Sense of Hearing*, and the *Kindes of Musicke*, haue most Operation vpon *Manners*; As to Incourage Men, and make them *Warlike*; To make them *Soft* and *Efeminate*; To make them *Graue*; To make them *Light*; To make them *Gentle* and inclined to *Pitie*, &c. The *Cause* is, for that the *Sense of Hearing* striketh the *Spirits* more immediatly, than the other *Senses*; And more incorporeally than the *Smelling*: For the *Sight*, *Taste*, and *Feeling*, haue their *Organs*, not of so present and immediate Access to the *Spirits*, as the *Hearing* hath. And as for the *Smelling*, (which indeed worketh also immediatly vpon the *Spirits*, and is forcible while the *Obiect* remaineth,) it is with a *Communication* of the *Breath*, or *Vapour* of the *Obiect Odorate*: But *Harmony* entering easily, and Mingling not at all, and Comming with a manifest *Motion*; doth by *Custom* of often *Affecting* the *Spirits*, and *Putting* them into one kinde of *Posture*, alter not a little the *Nature* of the *Spirits*, euen when the *Obiect* is remoued. And therefore we see, that *Tunes* and *Aires*, euen in their owne *Nature*, haue in themselves some *Affinitie* with the *Affections*; As there be *Merry Tunes*, *Dolefull Tunes*, *Solemne Tunes*; *Tunes inclining Mens minde to Pitie*; *Warlike Tunes*; &c. So as it is no *Maruell*, if they alter the *Spirits*; considering that *Tunes* haue a *Predisposition* to the *Motion* of the *Spirits* in themselves. But yet it hath beene noted, that though this *varietie of Tunes*, doth dispose the *Spirits* to *varietie of Passions*, conforme vnto them; yet generally, *Musicke* feedeth that disposition of the *Spirits* which it findeth. We see also that seuerall *Aires*, and *Tunes*, doe please seuerall *Nations*, and *Persons*, according to the *Sympathy* they haue with their *Spirits*.

Perspectiue hath beene with some diligence inquired ; And so hath the *Nature of Sounds*, in some sort, as farre as concerneth *Musicke*. But the *Nature of Sounds* in generall, hath beene superficially obserued. It is one of the subtillest Peeces of Nature. And besides, I practise, as I doe aduise ; which is, after long Inquirie of Things, Immerse in Matter, to interpose some Subiect, which is Immateriate, or lesse Materiate ; Such as this of *Sounds* ; To the end, that the *Intellect* may be Rectified, and become not Partiall.

It is first to be considered, what *Great Motions* there are in Nature, which passe without *Sound*, or *Noise*. The *Heauens* turne about, in a most rapide Motion, without *Noise* to vs perceiued ; Though in some *Dreames* they haue beene said to make an excellent *Musicke*. So the *Motions* of the *Comets*, and *Fiery Meteors* (as *Stella Cadens*, &c.) yeeld no *Noise*. And if it be thought, that it is the Greatnesse of distance from vs, whereby the *Sound* cannot be heard ; Wee see that *Lightnings*, and *Coruscations*, which are neere at hand, yeeld no *Sound* neither. And yet in all these, there is a Percussion and Diuision of the *Aire*. The *Winds* in the *Vpper Region* (which moue the *Clouds* aboue (which we call the *Racke*) and are not perceiued below) passe without *Noise*. The *lower Winds* in a *Plaine*, except they be strong, make no *Noise* ; But amongst *Trees*, the *Noise* of such *Winds* will be perceiued. And the *Winds* (generally) when they make a *Noise*, doe euer make it vnequally, Rising and Falling, and sometimes (when they are vehement) Trembling at the Height of their Blast. *Raine*, or *Haile* falling, (though vehemently,) yeeldeth no *Noise*, in passing thorow the *Aire*, till it fall vpon the *Ground*, *Water*, *Houses*, or the like. *Water* in a *Riuer* (though a swift Streame) is not heard in the Channell, but runneth in Silence, if it be of any depth ; But the very *Streame* vpon *Shallowes*, of *Grauell*, or *Pebble*, will be heard. And *Waters*, when they beat vpon the *Shore*, or are straitned, (as in the falls of *Bridges* ;) Or are dashed against themselves by *Winds*, giue a Roaring *Noise*. Any peece of *Timber*, or *Hard Bodie*, being thrust forwards by another *Bodie* Contiguous, without knocking, giueth no *Noise*. And so *Bodies* in weighing, one vpon another, though the *upper Bodie* presse the *lower Bodie* downe, make no *Noise*. So the *Motion* in the *Minute Parts* of any *Solide Bodie*, (which is the Principall Cause of *Violent Motion*, though vnobserued ;) passeth without *Sound* ; For that *Sound*, that is heard sometimes, is produced onely by the Breaking of the *Aire* ; And not by the Impulsion of the *Parts*. So it is manifest ; That where the Anteriour *Bodie* giueth way, as fast as the Posterious commeth on, it maketh no *Noise* ; be the *Motion* neuer so great, or swift.

Aire open, and at large, maketh no *Noise*, except it be sharply percussed ; As in the *Sound* of a *String*, where *Aire* is percussed by a hard, and

Experiments
in *Consort*, touching
Sounds ; and first touching
the *Nullity*, and *Entity* of
Sounds.

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and stiffe Body; And with a sharp loose; For if the String be not strained, it maketh no *Noise*. But where the *Aire is pent*, and strained, there Breath or other Blowing, (which carry but a gentle Percussion) suffice to create *Sound*; As in *Pipes*, and *Wind-Instruments*. But then you must note, that in *Recorders*, which goe with a gentle Breath, the *Concaue* of the *Pipe*, were it not for the *Fipple*, that straitneth the *Aire* (much more than the *Simple Concaue*;) would yeeld no *Sound*. For as for other *Wind-Instruments*, they require a forcible Breath; As *Trumpets*, *Cornets*, *Hunters hornes*, &c. Which appeareth by the blowne cheeks of him that windeth them. *Organs* also are blowne with a strong wind, by the Bellows. And note againe, that some kinde of *Wind-Instruments*, are blown at a small Hole in the side, which straitneth the Breath at the first Entrance; The rather, in respect of their *Trauerse*, and *Stop* about the Hole, which performeth the *Fipples* Part; As it is seene in *Flutes*, and *Fifes*, which will not giue *Sound*, by a Blast at the end, as *Recorders*, &c. doe. Likewise in all *Whistling*, you contract the Mouth; And to make it more sharp, Men sometimes vse their Finger. But in *Open Aire*, if you throw a Stone, or a Dart, they giue no *Sound*: No more doe *Bullets*, except they happen to be a little hollowed in the Casting; Which Hollownesse penneth the *Aire*: Nor yet *Arrowes*, except they be ruffled in their Feathers, which likewise penneth the *Aire*. As for *Small whistles*, or *Shepheards Oaten Pipes*; they giue a *Sound*, because of their extreme Slendernesse, whereby the *Aire* is more pent, than in a *Wider Pipe*. Againe, the *Voices* of *Men*, and Liuing Creatures, passe thorow the throat, which penneth the Breath. As for the *Iewes Harpe*, it is a sharp Percussion; And besides, hath the vantage of penning the *Aire* in the Mouth.

117 *Solide Bodies*, if they be very softly percussed, giue no *Sound*; As when a man treadeth very softly vpon *Boards*. So *Chests* or *Doores* in faire weather, when they open easily, giue no *Sound*. And *Cart-wheels* squeak not, when they are liquored.

118 The *Flame* of *Tapers*, or *Candles*, though it be a swift Motion, and breaketh the *Aire*, yet passeth without *Sound*, *Aire* in *Ouens*, though (no doubt) it doth (as it were) boyle, and dilate it selfe, and is repercussed; yet it is without *Noise*.

119 *Flame percussed by Aire*, giueth a *Noise*; As in Blowing of the Fire by Bellows; Greater, than if the Bellows should blow vpon the *Aire* it selfe. And so likewise *Flame percussing the Aire strongly*, (as when Flame suddenly taketh, and openeth,) giueth a *Noise*; So, *Great Flames*, whiles the one impelleth the other, giue a bellowing *Sound*.

120 There is a Conceit runneth abroad, that there should be a *White Powder*, which will discharge a Peece without *Noise*; which is a dangerous Experiment, if it should be true: For it may cause secret Murthers. But it seemeth to me vnpossible; For, if the *Aire* pent, be driven forth, and strike the *Aire* open, it will certainly make a *Noise*. As for the *White Powder* (if any such thing be, that may extinguish, or dead the *Noise*;) it

it is like to be a Mixture of *Petre*, and *Sulphur*, without *Coale*. For *Petre* alone will not take Fire. And if any man thinke, that the *Sound* may be extinguished, or deaded, by discharging the *Pent Aire*, before it cometh to the *Mouth* of the *Peece*, and to the *Open Aire*; That is not probable; For it will make more divided *Sounds*: As if you should make a Croffe Barrell hollow, thorow the Barrell of a *Peece*, it may be, it would giue seuerall *Sounds*, both at the Nose, and at the sides. But I conceit, that if it were possible, to bring to passe, that there should be no *Aire* pent at the Mouth of the *Peece*, the *Bullet* might fly with small, or no *Noise*. For first it is certaine, there is no *Noise* in the Percussion of the *Flame* vpon the *Bullet*. Next the *Bullet*, in piercing thorow the *Aire*, maketh no *Noise*; As hath beene said. And then, if there be no *Pent Aire*, that striketh vpon *Open Aire*, there is no Cause of *Noise*; And yet the Flying of the *Bullet* will not be stayed. For that *Motion* (as hath beene oft said) is in the Parts of the *Bullet*, and not in the *Aire*. So as triall must be made, by taking some small *Concaue* of *Metall*, no more than you meane to fill with Powder; And laying the *Bullet* in the Mouth of it, halfe out into the *Open Aire*.

I heard it affirmed by a Man, that was a great Dealer in Secrets, but he was but vaine; That there was a *Conspiracy* (which himselfe hindred,) to haue killed *Queene Mary*, Sister to *Queene Elizabeth*, by a *Burning-Glasse*, when shee walked in *Saint Iames Parke*, from the Leads of the House. But thus much (no doubt) is true; That if *Burning-Glasses* could be brought to a great strength, (as they talke generally of *Burning-Glasses*, that are able to burne a *Nauy*.) the Percussion of the *Aire* alone, by such a *Burning-Glasse*, would make no *Noise*; No more than is found in *Compassions*, and *Lightnings*, without *Thunders*.

I suppose, that *Impression* of the *Aire* with *Sounds*, asketh a time to be conueighed to the *Sense*; As well as the *Impression* of *Species visible*: Or else they will not be heard. And therefore, as the *Bullet* moueth so swift, that it is *Inuisible*; So the same *Swiftnesse* of *Motion* maketh it *Inaudible*: For wee see, that the Apprehension of the *Eye*, is quicker than that of the *Eare*.

All *Eruptions* of *Aire*, though small and slight, giue an *Entire* of *Sound*, which we call *Crackling*, *Puffing*, *Spitting*, &c. As in *Bay-sale*, and *Bay-leaves*, cast into the Fire; So in *Chesnuts*, when they leape forth of the Ashes; So in *Greene Wood* laid vpon the Fire, especially *Roots*; So in *Candles* that spit Flame, if they be wet; So in *Rasping*, *Sneezing*, &c. So in a *Rose-lease* gathered together into the fashion of a Purse, and broken vpon the Fore-head, or Backe of the Hand, as Children vse.

THe Cause giuen of *Sound*, that it should be an *Elision* of the *Aire* (wherby, if they mean any thing, they mean a *Cutting*, or *Diuiding*, or else an *Attenuating* of the *Aire*) is but a Terme of Ignorance: And the Motion is but a Catch of the Wit vpon a few Instances; As the Manner is in the *Philosophy* Receiued. And it is common with Men, that if they haue

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haue gotten a Pretty *Expresſion*, by a *Word of Art*, that *Expresſion* goeth currant; though it be empty of *Matter*. This Conceit of *Elifion*, appeareth moſt manifeſtly to be falſe, in that the *Sound* of a *Bell*, *String*, or the like, continueth melting, ſome time, after the *Percuſſion*; But ceaſeth ſtraight-ways, if the *Bell*, or *String*, be touched and ſtayed; whereas, if it were the *Elifion* of the *Aire*, that made the *Sound*, it could not be, that the Touch of the *Bell*, or *String*, ſhould extinguiſh ſo ſuddenly that Motion, cauſed by the *Elifion* of the *Aire*. This appeareth yet more manifeſtly, by *Chiming* with a Hammer, vpon the Out-ſide of a *Bell*; For the *Sound* will be according to the inward Concaue of the *Bell*; whereas the *Elifion*, or *Attenuation* of the *Aire*, cannot be but onely betweene the Hammer, and the Out-ſide of the *Bell*. So againe, if it were an *Elifion*, a broad Hammer, and a Bodkin, ſtrucke vpon Metall, would giue a diuers *Tone*; As well as a diuers *Loudneſſe*: But they doe not ſo; For though the *Sound* of the one be *Louder*, and of the other *Softer*, yet the *Tone* is the ſame. Beſides, in *Eccbo's*, (whereof ſome are as loud as the *Originall Voice*,) there is no new *Elifion*; but a *Repercuſſion* only. But that which conuinceth it moſt of all, is, that *Sounds* are generated, where there is no *Aire* at all. But theſe and the like Conceits, when Men haue cleared their vnderſtanding, by the light of Experience, will ſcatter, and breake vp like a Miſt.

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It is certaine, that *Sound* is not produced at the firſt, but with ſome *Locall Motion* of the *Aire*, or *Flame*, or ſome other *Medium*; Nor yet without ſome *Reſiſtance*, either in the *Aire*, or the *Body Percuſſed*. For if there be a meere Yeelding, or Ceſſion, it produceth no *Sound*; As hath beene ſaid. And therein *Sounds* differ from *Light*, and Colours; which paſſe thorow the *Aire*, or other *Bodies*, without any *Locall Motion* of the *Aire*; either at the firſt, or after. But you muſt attentiuely diſtinguiſh, betweene the *Locall Motion* of the *Aire*, (which is but *Vehiculum Cauſſa*, A Carrier of the *Sounds*,) and the *Sounds* themſelues, Conueighed in the *Aire*. For as to the former, we ſee manifeſtly, that no *Sound* is produced (no not by *Aire* it ſelfe againſt other *Aire*, as in *Organs*, &c.) but with a perceptible *Blaſt* of the *Aire*; And with ſome *Reſiſtance* of the *Aire* ſtrucken. For euen all *Speech*, (which is one of the gentleſt *Motions* of *Aire*,) is with expulſion of a little *Breath*. And all *Pipes* haue a *Blaſt*, as well as a *Sound*. We ſee alſo manifeſtly, that *Sounds* are carried with *Wind*: And therefore *Sounds* will be heard further with the *Wind*, than againſt the *Wind*; And likewise doe riſe and fall with the Intenſion or Remiſſion of the *Wind*. But for the *Impreſſion* of the *Sound*, it is quite another Thing; And is vtterly without any *Locall Motion* of the *Aire*, Perceptible; And in that reſembleth the *Species viſible*: For after a *Man* hath lured, or a *Bell* is rung, we cannot diſcerne any *Perceptible Motion* (at all) in the *Aire*, a long as the *Sound* goeth; but only at the firſt. Neither doth the *Wind* (as far as it carrieth a *Voice*,) with the *Motion* thereof, confound any of the Delicate, and Articulate Figurations of the *Aire*, in Varietie of Words. And if a *Man* ſpeake a good loudneſſe, againſt the

the *Flame* of a *Candle*, it will not make it tremble much; though most, when those *Letters* are pronounced, which contract the Mouth; As *F*, *S*, *V*, and some others. But *Gentle Breathing*, or *Blowing* without *speaking*, will moue the *Candle* far more. And it is the more probable, that *Sound* is without any *Locall Motion* of the *Aire*, because as it differeth from the *Sight*, in that it needeth a *Locall Motion* of the *Aire* at first; So it paralleleth in so many other things with the *Sight*, and *Radiation of Things visible*; Which (without all question) induce no *Locall Motion* in the *Aire*, as hath beene said.

Neuerthelesse it is true, that vpon the *Noise* of *Thunder*, and great *Ordnance*; Glasse windowes will shake; and Fishes are thought to bee fraied with the Motion, caused by *Noise* vpon the water. But these Effects are from the *Locall Motion* of the *Aire*, which is a Concomitant of the *Sound* (as hath beene said;) and not from the *Sound*.

It hath beene anciently reported, and is still receiued, that *Extreme Applauses*, and *Shouting of People* assembled in great Multitudes, haue so rarified, and broken the *Aire*, that *Birds* flying ouer, haue falne downe, the *Aire* being not able to support them. And it is beleeued by some, that *Great Ringing of Bels* in populous Cities, hath chased away *Thunder*: and also dissipated Pestilent *Aire*: All which may be also from the Concussion of the *Aire*, and not from the *Sound*.

A very great *Sound*, neere hand, hath stricken many *Deafe*; And at the Instant they haue found, as it were, the breaking of a Skin or Parchment in their Eare: And my selfe standing neere on that *Lured* loud, and shrill, had suddenly an Offence, as if somewhat had broken, or beene dislocated in my *Eare*; And immediatly after, a *loud Ringing*; (Not an ordinary Singing, or Hissing, but far louder, and differing;) so as I feared some *Deafnesse*. But after some halfe Quarter of an Houre it vanished. This Effect may be truly referred vnto the *Sound*: For (as is commonly receiued) an *ouer-potent Object* doth destroy the *Sense*; And *spirituall Species*, (both *Visible* and *Audible*) will worke vpon the Sensories, though they moue not any other *Body*.

In *Delation of Sounds*, the *Enclosure* of them preserueth them, and causeth them to be heard further. And wee finde in Roules of Parchment, or Trunckes, the Mouth being laid to the one end of the Roule of Parchment, or Truncke, and the *Eare* to the other, the *Sound* is heard much further, than in the *Open Aire*. The Cause is, for that the *Sound* spendeth, and is dissipated in the *Open Aire*; But in such Concaues it is conserued, and contracted. So also in a Peece of Ordnance, if you speak in the Touch-hole, and another lay his *Eare* to the Mouth of the Peece, the *Sound* passeth, and is farre better heard, than in the *Open Aire*.

It is further to bee considered, how it proueth and worketh, when the *Sound* is not enclosed all the Length of his Way, but passeth partly thorow open *Aire*; As where you *speake* some distance from a *Trunck*; or where the *Eare* is some distance from the *Trunck*, at the other End; Or where both *Mouth* and *Eare* are distant from the *Truncke*. And

it is tried, that in a long *Trunke*, of some eight or ten foot, the *Sound* is holpen, though both the *Mouth*, and the *Eare* be a handfull, or more, from the Ends of the *Trunke*; And somewhat more holpen, when the *Eare* of the *Hearer* is neere, than when the *Mouth* of the *Speaker*. And it is certaine, that the *Voice* is better heard in a *Chamber* from abroad, than abroad from within the *Chamber*.

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As the *Enclosure*, that is *Round about and Entire*, preserveth the *Sound*; So doth a *Semi-Concaue*, though in a lesse degree. And therefore, if you diuide a *Trunke* or a *Cane* into two, and one speake at the one end, and you lay your *Eare* at the other, it will carry the *Voice* further, than in the *Aire* at large. Nay further, if it bee not a full *Semi-Concaue*; but if you doe the like vpon the *Mast* of a *Ship*, or a *long Pole*, or a *Peece of Ordnance* (though one speake vpon the *Surface* of the *Ordnance*, and not at any of the *Bores*;) the *Voice* will be heard further, than in the *Aire* at large.

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It would be tried, how, and with what proportion of disadvantage, the *Voice* will be carried in an *Horne*, which is a line *Arched*; Or in a *Trumpet*, which is a line *Retorted*; Or in some *Pipe* that were *Sinuuous*.

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It is certaine, (howsoever it crosse the *Received Opinion*) that *Sounds* may be created without *Aire*, though *Aire* be the most fauourable *Deferent* of *Sounds*. Take a *Vessell* of *Water*, and knap a paire of *Tongs* some depth within the *Water*, and you shall heare the *Sound* of the *Tongswell*, and not much diminished; And yet there is no *Aire* at all present.

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Take one *Vessell* of *Siluer*, and another of *Wood*, and fill each of them full of *Water*, and then knap the *Tongs* together, as before, about an handfull from the *Bottom*, and you shall finde the *Sound* much more *Resounding* from the *Vessell* of *Siluer*, than from that of *Wood*: And yet if there be no water in the *Vessell*, so that you knap the *Tongs* in the *Aire*, you shall finde no difference, betweene the *Siluer* and *Woodden Vessell*. Whereby, beside the maine point of creating *Sound* without *Aire*, you may collect two Things: The one, that the *Sound* communiceth with the *Bottom* of the *Vessell*: The other, that such a *Communication* passeth farre better, thorow *Water*, than *Aire*.

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Strike any *Hard Bodies* together, in the *Middest* of a *Flame*, and you shall heare the *Sound*, with little difference, from the *Sound* in the *Aire*.

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The *Pneumaticall Part*, which is in all *Tangible Bodies*, and hath some *Affinity* with the *Aire*, performeth, in some degree, the *Parts* of the *Aire*; As when you knocke vpon an *Empty Barrell*, the *Sound* is (in part) created by the *Aire* on the *Out-side*; And (in part) by the *Aire* in the *Inside*; For the *Sound* will be greater or lesser, as the *Barrell* is more *Empty*, or more full; But yet the *Sound* participateth also with the *Spirit* in the *Wood*, thorow which it passeth, from the *Outside* to the *Inside*: And so it commeth to passe, in the *Chiming* of *Bels*, on the *Out-side*; where also the *Sound* passeth to the *Inside*: And a number of other

ther like Instances, whereof we shall speake more, when we handle the *Communication of Sounds*.

It were extreme Grossnesse to thinke (as we haue partly touched before) that the *Sound* in *Strings* is made, or produced, betweene the *Hand* and the *String*, or the *Quill* and the *String*, or the *Bow* and the *String*: For those are but *Vehicula Motus*, *Passages* to the *Creation* of the *Sound*; the *Sound* being produced betweene the *String* and the *Aire*; And that not by any *Impulsion* of the *Aire* from the first *Motion* of the *String*; but by the *Returne* or *Result* of the *String*, which was strained by the *Touch*, to his former Place: which *Motion* of *Result* is quicke and sharpe; Whereas the first *Motion*, is soft and dull. So the *Bow* tortureth the *String* continually, and thereby holdeth it in a Continuall *Trepidation*.

TAke a *Truncke*, and let one whistle at the one End, and hold your Eare at the other, and you shall finde the *Sound* strike so sharpe, as you can scarce endure it. The *Cause* is, for that *Sound* diffuseth it selfe in round; And so spendeth it Selfe; But if the *Sound*, which would scatter in *Open Aire*, be made to goe all into a Canale; It must needs giue greater force to the *Sound*. And so you may note, that *Enclosures* doe not onely preserue *Sound*, but also Encrease and Sharpen it.

A *Hunters Horne*, being greater at one end, than at the other, doth increase the *Sound* more, than if the *Horne* were all of an equall Bore. The *Cause* is, for that the *Aire*, and *Sound*, being first contracted at the lesser End, and afterwards hauing more Roome to spread at the greater End; do dilate themselues; And in Comming out strike more *Aire*; whereby the *Sound* is the Greater, and Baser. And euen *Hunters Hornes*, which are sometimes made straight, and not Oblique, are euer greater at the lower end. It would be tried also in *Pipes*, being made far larger at the lower End: Or being made with a *Belly* towards the lower End; And then issuing into a straight Concaue againe.

There is in *Saint Iames Fields*, a *Conduit* of *Bricke*, vnto which ioyneth a low *Vault*; And at the End of that, a *Round House* of Stone: And in the *Bricke Conduit* there is a *Window*; And in the *Round House* a *Slit* or *Rift* of some little breadth: If you cry out in the *Rift*, it will make a fearefull Roaring at the *Window*. The *Cause* is the same with the former; for that all *Concaues*, that proceed from more Narrow to more Broad, doe amplifie the *Sound* at the Comming out.

Hawkes Bels, that haue Holes in the Sides, giue a greater Ring, than if the *Pellet* did strike vpon *Brasse*, in the *Open Aire*. The *Cause* is the same with the first *Instance* of the *Truncke*; Namely, for that the *Sound* Enclosed with the Sides of the *Bell*, commeth forth at the *Holes* vnspent, and more strong.

In *Drums*, the Closenesse round about, that preserueth the *Sound* from dispersing, maketh the *Noise* come forth at the *Drum-Hole*, farre more loud, and strong, than if you should strike vpon the like *Skin*, extended

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tended in the Open Aire. The Cause is the same with the two precedent.

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Sounds are better heard, and further off, in an Evening, or in the Night, than at the Noone, or in the Day. The Cause is, for that in the Day, when the Aire is more Thin, (no doubt) the Sound pierceth better; But when the Aire is more Thicke (as in the Night) the Sound spendeth and spreadeth abroad lesse: And so it is a Degree of Enclosure. As for the Night, it is true also, that the Generall Silence helpeth.

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There be two Kinds of Reflexions of Sounds; The one at Distance, which is the *Eccho*; Wherein the *Originall* is heard distinctly, and the *Reflexion* also distinctly; Of which we shall speake hereafter: The other in *Concurrence*; When the Sound Reflecting (the *Reflexion* being neere at hand) returneth immediatly vpon the *Originall*, and so iterateth it not, but amplifieth it. Therefore we see, that Musicke vpon the water foundeth more; And so likewise Musicke is better in Chambers Wain-scotted, than Hanged.

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The Strings of a Lute, or Violl, or Virginalls, doe giue a far greater Sound, by reason of the *Knot*, and *Board*, and *Concaue* vnderneath, than if there were nothing but onely the *Flat* of a *Board*, without that *Hollow* and *Knot*, to let in the Vpper Aire into the Lower. The Cause is, the Communication of the Vpper Aire with the Lower; And Penning of both from Expence, or Dispersing.

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An *Irish Harpe* hath Open Aire on both sides of the Strings: And it hath the *Concaue* or *Belly*, not along the Strings, but at the End of the Strings. It maketh a more Resounding Sound, than a *Bandora*, *Orpharion*, or *Citterne*, which haue likewise *Wire-strings*. I iudge the Cause to be, for that Open Aire on both Sides helpeth, so that there be a *Concaue*; Which is therefore best placed at the End.

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In a *Virginall*, when the *Lid* is downe, it maketh a more exile Sound, than when the *Lid* is open. The Cause is, for that all Shutting in of Aire, where there is no competent Vent, dampeth the Sound. Which maintaineth likewise the former Instance; For the *Belly* of the *Lute*, or *Violl*, doth pen the Aire somewhat.

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There is a Church at *Glocester* (and as I haue heard, the like is in some other places;) where if you speake against a Wall, softly, another shall heare your Voice better a good way off, than neere hand. Enquire more particularly of the Frame of that Place. I suppose there is some Vault, or Hollow, or Isle, behind the Wall, and some Passage to it towards the further end of that Wall, against which you speake; So as the Voice of him that speaketh, slideth along the Wall, and then entreteth at some Passage, and communicateth with the Aire of the Hollow; For it is preserved somewhat by the plaine Wall; but that is too weake to giue a Sound Audible, till it hath communicated with the backe Aire.

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Strike vpon a *Bowstring*, and lay the *Horne* of the *Bow* neere your Eare, and it will increase the Sound, and make a degree of a Tone. The Cause is, for that the Sensory, by reason of the Close Holding, is percussed,

cuffed, before the Aire disperfeth. The like is, if you hold the *Horne* betwixt your Teeth. But that is a plaine *Delation* of the *Sound*; from the Teeth, to the Instrument of Hearing; For there is a great Entercourse betweene those two Parts; As appeareth by this; That a Harsh *Grating Tune* setteth the Teeth on edge. The like falleth out, if the *Horne* of the *Bow* be put vpon the Temples; But that is but the Slide of the *Sound* from thence to the Eare.

If you take a *Rod* of *Iron*, or *Brasse*, and hold the one end to your Eare, and strike vpon the other, it maketh a far greater *Sound*, than the like Stroke vpon the *Rod*, not so made Contiguous to the Eare. By which, and by some other *Instances*, that haue beene partly touched, it should appeare; That *Sounds* doe not only slide vpon the Surface of a Smooth Body, but doe also communicate with the Spirits, that are in the Pores of the Body.

I remember in *Trinity College* in *Cambridge*, there was an *Upper Chamber*, which being thought weake in the Roofe of it, was supported by a Pillar of *Iron*, of the bignesse of ones Arme, in the midst of the *Chamber*; Which if you had strucke, it would make a little flat Noise in the *Roome* where it was strucke; But it would make a great *Bombe* in the *Chamber* beneath.

The *Sound* which is made by *Buckets* in a *Well*, when they touch vpon the *Water*; Or when they strike vpon the side of the *Well*; Or when two *Buckets* dash the one against the other; These *Sounds* are deeper, and fuller, than if the like Percussion were made in the *Open Aire*. The Cause is, the Penning and Enclosure of the Aire, in the Concaue of the *Well*.

Barrels placed in a *Roome* vnder the Floare of a *Chamber*, make all *Noises* in the same *Chamber*, more Full and Relounding.

So that there be five waies (in generall) of Maioration of *Sounds*: Enclosure Simple; Enclosure with Dilatation; Communication; Reflexion Concurrent; and Approach to the Sensory.

For *Exility* of the *Voice*, or other *Sounds*: It is certaine, that the *Voice* doth passe thorow *Solid* and *Hard Bodies*, if they be not too thick. And thorow *Water*; which is likewise a very Close Body, and such an one, as letteth not in *Aire*. But then the *Voice*, or other *Sound*, is reduced, by such passage, to a great *Weaknesse*, or *Exility*. If therefore you stop the *Holes* of a *Hawkes Bell*, it will make no Ring, but a flat Noise, or Rattle. And so doth the *Aëtites*, or *Eagles Stone*, which hath a little *Stone* within it.

And as for *Water*, it is a certaine Triall: Let a Man goe into a *Bath*, and take a *Paile*, and turne the Bottom vpward, and carry the Mouth of it, (Euen,) downe to the Leuell of the *Water*; and so presse it downe vnder the *Water*, some handfull and an halfe, still keeping it euen, that it may not tilt on either side, & so the *Aire* get out: Then let him that is in the *Bath*, diue with his Head so far vnder *Water*, as he may put his Head into the *Paile*; & there wil come as much *Aire* bubling forth, as wil make

Roome for his Head. Then let him speak; and any that shall stand without, shall heare his *Voice* plainly; but yet made extreme sharp and exile, like the *Voice* of *Puppets*: But yet the *Articulate Sounds* of the *Words* will not be confounded. Note that it may be much more handsomly done, if the *Pail* be put ouer the Mans head aboue *Water*, and then he cower downe, and the *Pail* be pressed downe with him. Note that a man must kneele or sit, that he may be lower than the *Water*. A Man would think, that the *Sicilian Poet* had knowledge of this *Experiment*; For he saith; That *Hercules Page Hylas* went with a *Water-pot*, to fill it at a pleasant *Fountaine*, that was neere the *Shore*, and that the *Nymphs* of the *Fountaine* fell in loue with the *Boy*, and pulled him vnder *Water*, keeping him aliue; And that *Hercules* missing his *Page*, called him by his Name, aloud, that all the *Shore* rang of it; and that *Hylas* from within the *Water*, answered his Master; But (that which is to the present purpose) with so small and exile a *Voice*, as *Hercules* thought he had beene three miles off, when the *Fountaine* (indeed) was fast by.

156 In *Lutes*, and *Instruments* of *Strings*, if you stop a *String* high (whereby it hath lesse scope to tremble) the *Sound* is more *Treble*, but yet more dead.

157 Take two *Sawcers*, and strike the Edge of the one against the Bottom of the other, within a *Pail* of *Water*; And you shall finde, that as you put the *Sawcers* lower and lower, the *Sound* groweth more flat; euen while Part of the *Sawcer* is aboue the *Water*; But that Flatnesse of *Sound* is ioyned with a Harshnesse of *Sound*; which (no doubt) is caused by the Inequality of the *Sound*, which commeth from the part of the *Sawcer* vnder the *Water*, and from the Part aboue. But when the *Sawcer* is wholly vnder the *Water*, the *Sound* becommeth more cleare, but farre more low; And as if the *Sound* came from a farre off.

158 A *Soft Body* dampeth the *Sound*, much more than a *Hard*; As if a *Bell* hath *Cloth*, or *Silke* wrapped about it, it deadeth the *Sound* more, than if it were *Wood*. And therefore in *Clericals*, the *Keyes* are lined; And in *Colleges* they vse to line the *Tablemen*.

159 Triall was made in a *Recorder*, after these seuerall manners. The Bottom of it was set against the *Palme* of the *Hand*; stopped with *Wax* round about; set against a *Damaske Cushion*; Thrust into *Sand*; Into *Ashes*; Into *Water* (halfe an *Inch* vnder the *Water*;) Close to the Bottom of a *Siluer Basin*; And still the *Tone* remained: but the Bottom of it was set against a *Woollen Carpet*; A *Lining* of *Plush*; A *Lock* of *Wooll*, (though loosely put in;) Against *Snow*; And the *Sound* of it was quite deaded, and but *Breath*.

160 *Iron* Hot, produceth not so full a *Sound*, as when it is *Cold*; For while it is hot, it appeareth to be more *Soft*, and lesse *Resounding*. So likewise *Warme Water*, when it falleth, maketh not so full a *Sound*, as *Cold*: And I conceiue it is softer, and neerer the Nature of *Oile*; For it is more slippery; As may be perceiued, in that it scowreth better.

161 Let there be a *Recorder* made, with two *Fipples*, at each end one; The

Truncke of it of the length of two *Recorders*, and the Holes answerable toward each end; And let two play the same lesson vpon it, at an *Vnison*: And let it be noted, whether the *Sound* be confounded; or amplified; or dulled. So likewise let a *Crosse* bee made, of two *Trunckes* (thorow-out) hollow; And let two speake, or sing, the one long-waies, the other trauese: And let two heare at the opposite Ends; And note, whether the *Sound* be confounded; amplified; or dulled. Which two *Instances* will also giue light to the *Mixture* of *Sounds*; whereof we shall speake hereafter.

A *Bellows* blowne in at the *Hole* of a *Drumme*, and the *Drumme* then stricken, maketh the *Sound* a little flatter, but no other apparent Alteration. The *Cause* is manifest; Partly for that it hindereth the Issue of the *Sound*; And partly for that it maketh the *Aire*, being blowne together, lesse moueable.

THe *Loudnesse* and *Softnesse* of *Sounds*, is a Thing distinct from the *Magnitude* and *Exility* of *Sounds*; For a *Base String*, though softly stricken, giueth the greater *Sound*; But a *Treble String*, if hard stricken, will be heard much further off. And the *Cause* is, for that the *Base String* striketh more *Aire*; And the *Treble* lesse *Aire*, but with a sharper Percussion.

It is therefore the *Strength* of the *Percussion*, that is a Principall Cause of the *Loudnesse* or *Softnesse* of *Sounds*: As in knocking harder or softer; Winding of a Horne stronger or weaker; Ringing of a Hand-bell harder or softer, &c. And the *Strength* of this *Percussion*, consisteth, as much, or more, in the *Hardnesse* of the *Body Percussed*, as in the *Force* of the *Body Percussing*: For if you strike against a Cloth, it will giue a lesse *Sound*; If against Wood, a greater; If against Metall, yet a greater; And in Metalls, if you strike against Gold, (which is the more pliant,) it giueth the flatter *Sound*; If against Silver, or Brasse, the more Ringing *Sound*. As for *Aire*, where it is strongly pent, it matcheth a *Hard Body*. And therefore we see in discharging of a *Peece*, what a great *Noise* it maketh. We see also, that the Charge with Bullet; Or with Paper wet, and hard stopped; Or with Powder alone, rammed in hard; maketh no great difference in the *Loudnesse* of the Report.

The *Sharpnesse* or *Quicknesse* of the *Percussion*, is a great Cause of the *Loudnesse*, as well as the *Strength*: As in a Whip, or Wand, if you strike the *Aire* with it, the Sharper and Quicker you strike it, the *Louder Sound* it giueth. And in playing vpon the *Lute*, or *Virginalls*, the quicke Stroke or Touch, is a great life to the *Sound*. The *Cause* is, for that the Quicke Striking cutteth the *Aire* speedily; whereas the Soft Striking doth rather beat, than cut.

The *Communication* of *Sounds* (as in Bellies of *Lutes*, *Emp-tie Vessells*, &c.) hath beene touched obiter, in the *Maioration* of *Sounds*: But it is fit also to make a *Title* of it apart.

The

162

Experiments
in Consort,
touching the
Loudnesse or
Softnesse of
Sounds; and
their Carriage at
longer or shorter
Distance.

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164

165

Experiments
in Consort, tou-
ching the Com-
munication of
Sounds.

166

The *Experiment* for greatest Demonstration of *Communication* of *Sounds*, is the *Chiming* of *Bells*; whereif you strike with a Hammer vpon the Vpper Part, and then vpon the Midst, and then vpon the Lower, you shall finde the *Sound* to be more Treble, and more Base, according vnto the Concaue, on the Inside; though the percussioe be onely on the Out-side.

167

When the *Sound* is created betweene the *Blast* of the *Mouth*, and the *Aire* of the *Pipe*, it hath neuerthelesse some *Communication* with the Matter of the Sides of the *Pipe*, and the *Spirits* in them contained; for in a *Pipe* or *Trumpet*, of Wood, and Brasse, the *Sound* will be diuers; So if the *Pipe* be couered with *Cloth*, or *Silke*, it will giue a diuers *Sound*, from that it would doe of it selfe; So, if the *Pipe* be a little wet on the *In-side*, it will make a differing *Sound*, from the same *Pipe* drie.

168

That *Sound* made within *Water*, doth communicate better with a hard Body thorow *Water*, than made in *Aire*, it doth with *Aire*; Vide *Experimentum* 134.

Experiments
in Confort tou-
ching Equality,
and Inequality
of Sounds.

We haue spoken before (in the *Inquisition* touching *Musicke*,) of *Musicall Sounds*, whereunto there may be a Concord or Discord in two Parts; Which *Sounds* we call *Tones*: And likewise of *Immusicall Sounds*; And haue giuen the *Cause*, that the *Tone* proceedeth of *Equality*, and the other of *Inequality*. And we haue also expressed there, what are the *Equall Bodies* that giue *Tones*, and what are the *Vnequall* that giue none. But now we shall speake of such *Inequality* of *Sounds*, as proceedeth, not from the Nature of the Bodies themselues, but is Accidentall; Either from the *Roughnesse*, or *Obliquity* of the *Passage*; Or from the *Doubling* of the *Percutient*; Or from the *Trepidation* of the *Motion*.

169

A *Bell*, if it haue a *Rift* in it, whereby the *Sound* hath not a cleare *Passage*, giueth a *Hoarse* and *Iarring Sound*; So the *Voice* of *Man*, when by Cold taken the *Wefill* groweth rugged, and (as we call it) furred, becommeth hoarse. And in these two *Instances*, the *Sounds* are Ingrate; because they are meerey *Vnequall*: But, if they be *Vnequall* in *Equalitie*, then the *Sound* is Gratefull, but Purling.

170

All *Instruments*, that haue either *Returns*, as *Trumpets*; Or *Flexions*, as *Cornets*; Or are *Drawne up*, and *put from*, as *Sackbuts*; haue a *Purling Sound*: But the *Recorder* or *Flute*, that haue none of these *Inequalities*, giue a cleare *Sound*. Neuerthelesse, the *Recorder* it selfe, or *Pipe* moistened a little in the Inside, soundeth more solemnly, and with a little Purling, or Hissing. Again, a *Wreathed String*, such as are in the Base Strings of *Bandoraes*, giueth also a *Purling Sound*.

171

But a *Lute-string*, if it be meerey *Vnequall* in his Parts, giueth a Harsh and

and Vntuneable *Sound*; which *Strings* we call *False*, being bigger in one Place than in another; And therefore *Wire-strings* are neuer *False*. We see also, that when we trie a *False Lute-string*, we vse to extend it hard betweene the fingers, and to fillip it; And if it giueth a double *Species*, it is *True*; But if it giueth a treble, or more, it is *False*.

Waters, in the *Noise* they make as they runne, represent to the Eare a *Trembling Noise*; And in *Regalls*, (where they haue a *Pipe*, they call the *Nightingale-Pipe*, which containeth *Water*) the *Sound* hath a continuall *Trembling*: And Children haue also little Things they call *Cockes*, which haue *Water* in them; And when they blow, or whistle in them, they yeeld a *Trembling Noise*; Which *Trembling of Water*, hath an affinitie with the Letter *Z*. All which *Inequalities of Trepidation*, are rather pleasant, than otherwise.

All *Base Notes*, or very *Treble Notes*, giue an *Asper Sound*; For that the *Base* striketh more *Aire*, than it can well strike equally: And the *Treble* cutteth the *Aire* so sharpe, as it returneth too swift, to make the *Sound* Equall: And therefore a *Meane* or *Tenor*, is the sweetest Part.

We know Nothing, that can at pleasure make a *Musical* or *Immusical* *Sound*, by voluntary *Motion*, but the *Voice of Man*, and *Birds*. The Cause is, (no doubt) in the *Weasill* or *Wind-pipe*, (which we call *Aspera Arteria*,) which being well extended, gathereth *Equality*; As a *Bladder* that is wrinckled; if it be extended, becommeth smooth. The *Extension* is alwayes more in *Tones*, than in *Speech*: Therefore the *Inward Voice* or *Whisper* can neuer giue a *Tone*: And in *Singing*, there is (manifestly) a greater *Working* and *Labour* of the *Throat*, than in *Speaking*; As appeareth in the *Thrusting out*, or *Drawing in* of the *Chin*, when we sing.

The *Humming of Bees*, is an *Vnequall Buzzing*; And is conceiued, by some of the *Ancients*, not to come forth at their *Mouth*, but to be an *Inward Sound*; But (it may be) it is neither; But from the motion of their *Wings*; For it is not heard but when they stirre.

All *Metalls quenched in Water*, giue a *Sibilation* or *Hissing Sound*; (which hath an Affinitie with the letter *Z*.) notwithstanding the *Sound* be created betweene the *Water* or *Vapour*, and the *Aire*. *Seething* also, if there be but small *Store of Water* in a *Vessell*, giueth a *Hissing Sound*; But *Boyling* in a full *Vessell*, giueth a *Bubling Sound*, drawing somewhat neare to the *Cockes* vsed by Children.

Triall would be made, whether the *Inequality*, or *Interchange* of the *Medium*, will not produce an *Inequality of Sound*; As if three *Bells* were made one within another, and *Aire* betwixt Each; and then the outermost *Bell* were chimed with a *Hammer*, how the *Sound* would differ from a *Simple Bell*. So likewise take a *Plate of Brasse*, and a *Plancke of Wood*, and ioyn them close together, and knock vpon one of them, and see if they do not giue an *Vnequall Sound*. So make two or three *Partitions of Wood* in a *Hogshhead*, with *Holes* or *Knots* in them; And marke the difference of their *Sound*, from the *Sound* of an *Hogshhead*, without such *Partitions*.

Experiments
in Consort,
touching the
more Treble, and
the more Base
Tones, or Musi-
call Sounds.

178

IT is euident, that the *Percussion* of the *Greater Quantity of Aire*, causeth the *Baser Sound*; And the *lesse Quantity*, the more *Treble Sound*. The *Percussion* of the *Greater Quantity of Aire*, is produced by the *Greatnesse of the Body Percussing*; By the *Latitude of the Concave*, by which the *Sound* passeth; and by the *Longitude of the same Concave*. Therefore we see that a *Base string*, is greater than a *Treble*; A *Base Pipe* hath a greater Bore than a *Treble*; And in *Pipes*, and the like, the lower the Note Holes be, and the further off from the Mouth of the *Pipe*, the more *Base Sound* they yeeld; And the nearer the Mouth, the more *Treble*. Nay more, if you strike an *Entire Body*, as an *Andiron of Brasse*, at the Top, it maketh a more *Treble Sound*; And at the Bottome a *Baser*.

179

It is also euident, that the *Sharper or Quicker Percussion of Aire* causeth the more *Treble Sound*; And the *Slower or Heauier*, the more *Base Sound*. So we see in *Strings*; the more they are wound vp, and strained; (And thereby giue a more quicke Start-backe;) the more *Treble* is the *Sound*; And the slacker they are, or lesse wound vp, the *Baser* is the *Sound*. And therefore a Bigger *String* more strained, and a Lesser *String*, lesse strained, may fall into the same *Tone*.

180

Children, Women, Eunuchs haue more small and shrill *Voyces*, than *Men*. The Reason is, not for that *Men* haue greater Heat, which may make the *Voice* stronger, (for the strength of a *Voice* or *Sound*, doth make a difference in the *Loudnesse* or *Softnesse*, but not in the *Tone*;) But from the Dilatation of the Organ; which (it is true) is likewise caused by Heat. But the Cause of *Changing the Voice*, at the yeares of Pubertie, is more obscure. It seemeth to be, for that when much of the moisture of the Body, which did before irrigate the Parts, is drawne downe to the *Spermatieall vessells*; it leaueth the Body more hot than it was; whence cometh the Dilatation of the Pipes: For we see plainly, all Effects of Heat, doe then come on; As Pilosity, more Roughnesse of the Skinne, Hardnesse of the Flesh, &c.

181

The Industry of the *Musitian*, hath produced two other Meanes of *Straining*, or *Intension of Strings*, besides their *Winding vp*. The one is the *Stopping* of the *String* with the *Finger*; As in the Neckes of Lutes, Viols, &c. The other is the *Shortnesse* of the *String*; As in Harps, Virginalls, &c. Both these haue one, and the same reason; For they cause the *String* to giue a quicker Start.

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In the *Straining* of a *String*, the further it is strained, the lesse *Superstraining* goeth to a *Note*; For it requireth good *Winding* of a *String*, before it will make any *Note* at all: And in the Stops of Lutes, &c. the higher they goe, the lesse Distance is betweene the Frets.

183

If you fill a *Drinking-Glasse* with *Water*, (especially one Sharpe below, and Wide above,) and fillip vpon the Brim, or Out-side; And after emptie Part of the *Water*, and so more and more, and still trie the *Tone* by Fillipping; you shall finde the *Tone* fall, and be more *Base*, as the *Glasse* is more Emptie.

The

The Iust and Measured *Proportion* of the *Aire Percussed*, towards the *Basenesse* or *Trebleness* of *Tones*, is one of the greatest Secrets in the Contemplation of *Sounds*. For it discovereth the true *Coincidence* of *Tones* into *Diapasons*; Which is the Returne of the same *Sound*. And so of the *Concords* and *Discords*, betweene the *Vnison*, and *Diapason*; Which we haue touched before, in the *Experiments* of *Musicke*; but thinke fit to resume it here, as a principall Part of our Enquiry touching the *Nature* of *Sounds*. It may be found out in the *Proportion* of the *Winding* of *Strings*: In the *Proportion* of the *Distance* of *Frets*; And in the *Proportion* of the *Concaue* of *Pipes*, &c. But most commodiously in the last of these.

Trie therefore the *Winding* of a *String* once about, as soone as it is brought to that Extension, as will giue a *Tone*; And then of twice about; And thrice about, &c. And marke the Scale or Difference of the Rise of the *Tone*: Whereby you shall discover, in one, two Effects; Both the *Proportion* of the *Sound* towards the *Dimension* of the *Winding*; And the *Proportion* likewise of the *Sound* towards the *String*, as it is more or lesse strained. But note that to measure this, the way will be, to take the Length in a right Line of the *String*, vpon any *Winding* about of the Pegge.

As for the *Stops*, you are to take the *Number* of *Frets*; And principally the *Length* of the *Line*, from the first Stop of the *String*, vnto such a Stop as shall produce a *Diapason* to the former Stop, vpon the same *String*.

But it will best (as it is said) appeare, in the *Bores* of *Wind-Instruments*: And therefore cause some halfe dozen *Pipes*, to be made, in length, and all things else, alike, with a single, double, and so on to a sextuple *Bore*; And so marke what Fall of *Tone* euery one giueth. But still in these three last *Instances*, you must diligently obserue, what *length* of *String*, or *Distance* of *Stop*, or *Concaue* of *Aire*, maketh what *Rise* of *Sound*. As in the last of these (which (as we said) is that, which giueth the aptest demonstration,) you must set downe what Encrease of *Concaue* goeth to the Making of a *Note* higher; And what of two *Notes*; And what of three *Notes*; And so vp to the *Diapason*: For then the great Secret of *Numbers*, and *Proportions*, will appeare. It is not vnlike, that those that make *Recorders*, &c. know this already: for that they make them in *Sets*. And likewise *Bell-founders* in fitting the *Tune* of their *Bells*. So that Enquiry may saue Triall. Surely, it hath beene obserued by one of the *Ancients*, that an *Emptie Barrell* knocked vpon with the finger, giueth a *Diapason* to the *Sound* of the like *Barrell full*; But how that should be, I doe not well vnderstand; For that the knocking of a *Barrell full*, or *Emptie*, doth scarce giue any *Tone*.

There

Experiments
in Confort,
touching the
Proportion of
Treble and *Base*
Tones.

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There is required some sensible Difference in the *Proportion* of creating a *Note*, towards the *Sound* it selfe, which is the *Passive*: And that it be not too neare, but at a distance. For in a *Recorder*, the three vppermost Holes, yeeld one *Tone*; which is a *Note* lower than the *Tone* of the first three. And the like (no doubt) is required in the Winding or Stopping of *Strings*.

Experiments
in Consort
touching Exte-
riour, and inte-
riour Sounds.

There is another Difference of *Sounds*, which we will call *Exteriour*, and *Interiour*. It is not *Soft*, nor *Loud*: Nor it is not *Base*, nor *Treble*: Nor it is not *Musical*, nor *Immusical*: Though it be true, that there can be no *Tone* in an *Interiour Sound*: But on the other side, in an *Exteriour Sound*, there may be both *Musical* and *Immusical*. We shall therefore enumerate them, rather than precisely distinguish them; Though (to make some Adumbration of that we meane) the *Interiour* is rather an *Impulsion* or *Contusion* of the *Aire*, than an *Elision* or *Section* of the same. So as the *Percussion* of the one, towards the other, differeth, as a *Blow* differeth from a *Cut*.

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In *Speech* of *Man*, the *Whispering*, (which they call *Susurrus* in *Latine*,) whether it be louder or softer, is an *Interiour Sound*; But the *Speaking out*, is an *Exteriour Sound*; And therefore you can neuer make a *Tone*, nor sing in *Whispering*; But in *Speech* you may: So *Breathing*, or *Blowing* by the *Mouth*, *Bellows*, or *Wind*, (though loud) is an *Interiour Sound*; But the *Blowing* thorow a *Pipe*, or *Concaue*, (though soft) is an *Exteriour*. So likewise, the greatest *Winds*, if they haue no Coarctation, or blow not hollow, giue an *Interiour Sound*; The *Whistling* or hollow *Wind* yeeldeth a *Singing*, or *Exteriour Sound*; The former being pent by some other *Body*; The latter being pent in by his owne *Density*: And therefore we see, that when the *Wind* bloweth hollow, it is a *Signe* of *Raine*. The *Flame*, as it moueth within it selfe, or is blowne by a *Bellows*, giueth a *Murmur* or *Interiour Sound*.

189

There is no *Hard Body*, but stricke against another *Hard Body*, will yeeld an *Exteriour Sound*, greater or lesser: In so much as if the *Percussion* be ouer-soft, it may induce a *Nullity* of *Sound*; But neuer an *Interiour Sound*; As when one treadeth so softly, that he is not heard.

190

Where the *Aire* is the *Percutient*, pent, or not pent, against a *Hard Body*, it neuer giueth an *Exteriour Sound*; As if you blow strongly with a *Bellows* against a *Wall*.

191

Sounds (both *Exteriour* and *Interiour*.) may be made, as well by *Suction*, as by *Emission* of the *Breath*: As in *Whistling*, or *Breathing*.

Experiments
in Consort tou-
ching Articula-
tion of Sounds.

192

IT is euident, and it is one of the strangest Secrets in *Sounds*, that the whole *Sound* is not in the whole *Aire* only; But the whole *Sound* is also in euery small *Part* of the *Aire*. So that all the curious *Diuersity* of *Articulate*

culat Sounds, of the Voice of Man, or Birds, will enter at a small Cranny, Inconfused.

The *Unequall Agitation* of the *Winds*, and the like, though they bee materiall to the Carriage of the *Sounds*, further, or lesse way; yet they doe not confound the *Articulation* of them at all, within that distance that they can be heard; Though it may be, they make them to be heard lesse Way, than in a Still; as hath beene partly touched.

Ouer-great Distance confoundeth the *Articulation* of *Sounds*; As wee see, that you may heare the *Sound* of a Preachers voice, or the like, when you cannot distinguish what he saith. And one *Articulate Sound* will confound another; As when many speake at once.

In the *Experiment* of *Speaking under Water*, when the Voice is reduced to such an Extreme Exility, yet the *Articulate Sounds*, (which are the *Words*,) are not confounded; as hath beene said.

I conceiue, that an *Extreme Small*, or an *Extreme Great Sound*, cannot be *Articulate*; But that the *Articulation* requireth a *Mediocrity* of *Sound*: For that the *Extreme Small Sound* confoundeth the *Articulation* by *Contracting*; And the *Great Sound*, by *Dispersing*: And although (as was formerly said) a *Sound Articulate*, already created, will be contracted into a small Cranny; yet the first *Articulation* requireth more Dimension.

It hath beene obserued, that in a *Roome*, or in a *Chappell*, Vaulted below, and Vaulted likewise in the Roofe, a Preacher cannot be heard so well, as in the like Places not so Vaulted. The Cause is, for that the *Subsequent Words* come on, before the *Precedent words* vanish: And therefore the *Articulate Sounds* are more confused, though the *Grosse* of the *Sound* be greater.

The *Motions* of the *Tongue*, *Lips*, *Throat*, *Pallas*, &c. which goe to the *Making* of the seuerall *Alphabetical Letters*, are worthy Enquiry, and pertinent to the present *Inquisition* of *Sounds*: But because they are subtill, and long to describe, we will refer them ouer, and place them amongst the *Experiments* of *Speech*. The *Hebrewes* haue beene diligent in it, and haue assigned, which *Letters* are *Labiall*, which *Dental*, which *Gutturall*, &c. As for the *Latines*, and *Grecians*, they haue distinguished betweene *Semi-vowels*, and *Mutes*; And in *Mutes*, betweene *Muta Tennes*, *Media*, and *Aspirata*; Not amisse; But yet not diligently enough. For the speciall *Strokes*, and *Motions*, that create those *Sounds*, they haue little enquired: As that the *Letters*, *B.P.F.M.* are not expressed, but with the *Contracting*, or *Shutting* of the *Mouth*; That the *Letters* *N.* and *B.* cannot be pronounced, but that the *Letter* *N.* will turne into *M.* As *Hecatomba*, will be *Hecatomba*. That *M.* and *T.* cannot be pronounced together, but *P.* will come betweene; as *Emtus*, is pronounced *Emptus*; And a Number of the like. So that if you enquire to the full; you will finde, that to the *Making* of the whole *Alphabet*, there will be fewer *Simple Motions* required, than there are *Letters*.

The *Lungs* are the most Spongy Part of the Body; And therefore ablest to contract, and dilate it selfe: And where it contracteth it selfe,

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it expelleth the *Aire*; which thorow the *Artire*, *Throat*, and *Mouth*, maketh the *Voice*: But yet *Articulation* is not made, but with the helpe of the *Tongue*, *Pallat*, and the rest of those they call *Instruments* of *voice*.

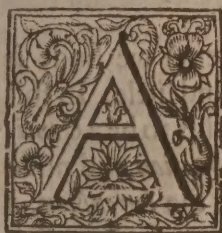
There is found a Similitude, betweene the *Sound* that is made, by *Inanimate Bodies*, or by *Animate Bodies*, that haue no *Voice*, *Articulate*; and diuers *Letters* of *Articulate Voices*: And commonly Men haue giuen such Names to those *Sounds*, as doe allude vnto the *Articulate Letters*. As *Trembling* of *Water* hath Resemblance with the *Letter L*; *Quenching* of *Hot Metals*, with the *Letter Z*; *Snarling* of *Dogs*, with the *Letter R*; The *Noise* of *Scratchowles*, with the *Letter Sh*; *Voice* of *Cats*, with the *Dyphthong Eu*; *Voice* of *Cuckoes*, with the *Dyphthong Ou*; *Sounds* of *Strings*, with the *Letter Ng*: So that if a Man, (for *Curiosity*, or *Strangenesse* sake) would make a *Puppet*, or other *Dead Body*, to pronounce a *Word*; Let him consider, on the one Part, the *Motion* of the *Instruments* of *Voice*; and on the other part the like *Sounds* made in *Inanimate Bodies*; And what *Conformity* there is that causeth the *Similitude* of *Sounds*; And by that he may minister light to that *Effect*.

NATV-



NATVRALL HISTORIE.

III. Century.



ALL Sounds (whatsoever) move Round; That is to say; On all Sides; Upwards; Downwards; Forwards; and Backwards. This appeareth in all Instances.

Sounds doe not require to bee conveyed to the Sense, in a Right Line, as Visibles doe, but may be Arched; Though it be true, they move strongest in a Right Line; Which neuertheless is not caused by the Rightnesse of the Line, but by the Shortnesse of the distance; *Linea recta breuissima*. And therefore we see, if a Wall bee betweene, and you speake on the one Side, you heare it on the other; Which is not because the Sound passeth thorow the Wall; but Archeth over the Wall.

If the Sound be Stopped and Repercussed, it commeth about on the other Side, in an Oblique Line. So, if in a Coach, one side of the Boot be downe, and the other vp; And a Begger beg on the Close Side; you would thinke that he were on the Open Side. So likewise, if a Bell or Clocke, be (for Example) on the North-side of a Chamber; And the Window of that Chamber be vpon the South; He that is in the Chamber, will thinke the Sound came from the South.

Sounds though they spread round, (so that there is an Orbe or Spherical Area of the Sound;) yet they move strongest, and goe furthest in the Fore-lines, from the first Locall Impulsion of the Aire. And therefore in Preaching, you shall heare the Preachers Voice, better, before the Pulpit, than behinde it, or on the Sides, though it stand open. So a Harquebuz, or Ordnance, will be further heard, forwards, from the Mouth of the Peece, than backwards, or on the Sides.

It may bee doubted, that Sounds doe move better Downwards

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Experiments
in Confort
touching the
Motions of
Sounds, in what
Lines they are
Circular, Ob-
lique, Straights;
Upwards, down-
wards; For-
wards, Back-
wards.

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than Vpwards. *Pulpits* are placed high aboue the People. And when the Ancient *Generalls* spake to their Armies, they had euer a Mount of Turfe cast vp, whereupon they stood: But this may be imputed to the Stops and Obstacles, which the voice meeteth with, when one speaketh vpon the leuell. But there seemeth to be more in it: For it may bee, that *Spirituall Species*, both of *Things Visible* and *Sounds*, doe moue better Downwards than Vpwards. It is a strange Thing, that to Men standing below on the Ground, those that be on the Top of Pauls, seeme much lesse than they are, and cannot be knowne; But to Men aboue, those below seeme nothing so much lessened, and may bee knowne: yet it is true, that all things to them aboue, seeme also somewhat contracted, and better collected into Figure: as *Knots* in *Gardens* shew best from an Vpper-window, or Tarras.

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But to make an exact Triall of it, let a Man stand in a *Chamber*, not much aboue the Ground, and speake out at the window, through a *Truncke*, to one standing on the Ground, as softly as he can, the other laying his Eare close to the *Trunck*: Then *via versa*, let the other speake below keeping the same Proportion of Softnesse; And let him in the *Chamber* lay his Eare to the *Trunck*: And this may be the aptest Meanes, to make a Iudgement, whether *Sounds* descend, or ascend, better.

Experiments
in Confort
touching the
Lasting & Peri-
suing of Sounds;
And touching
the Time they
require to their
Generation, or
Delation.

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After that *Sound* is created (which is in a moment) we finde it continueth some small time, melting by little and little. In this there is a wonderfull Errour amongst Men, who take this to be a *Continuance* of the First *Sound*; whereas (in truth) it is a *Renouation*, and not a *Continuance*: For the *Body percussed*, hath by reason of the *Percussion*, a *Trepidation* wrought in the *Minute Parts*; and so reneweth the *Percussion* of the *Aire*. This appeareth manifestly, because that the Melting *Sound* of a Bell, or of a String stricken, which is thought to be a *Continuance*, ceaseth as soone as the Bell or String are touched. As in a *Virginal*, as soone as euer the *Iacke* falleth; and toucheth the String, the *Sound* ceaseth; And in a Bell, after you haue chimed vpon it, if you touch the Bell, the *Sound* ceaseth. And in this you must distinguish, that there are two *Trepidations*: The one Manifest, and Locall; As of the Bell, when it is Penfile: The other Secret, of the *Minute Parts*; such as is described in the ninth Instance. But it is true, that the *Locall* helpeth the *Secret* greatly. We see likewise that in Pipes, and other winde Instruments, the *Sound* lasteth no longer, than the breath bloweth. It is true, that in Organs, there is a confused Murmur for a while, after you haue plaied; But that is but while the Bellowes are in Falling.

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It is certaine, that in the *Noise* of great *Ordnance*, where many are shot off together, the *Sound* will be carried, (at the least) twenty Miles vpon the land, and much further vpon the Water. But then it will come to the Eare; Not in the Instant of the Shooting off, but it will come an Houre, or more later. This must needs be a *Continuance* of the First *Sound*; For there is no *Trepidation* which should renew it. And
the

the Touching of the *Ordnance* would not extinguish the *Sound* the sooner: So that in great *Sounds* the *Continuance* is more than Momentary.

To try exactly the time wherein *Sound* is *Delated*, Let a Man stand in a Steeple, and haue with him a Taper; And let some Vaile be put before the Taper; And let another Man stand in the Field a Mile off. Then let him in the Steeple strike the Bell; And in the same Instant withdraw the Vaile; And so let him in the Field tell by his Pulse what distance of *Time* there is, betweene the *Light scene*, and the *Sound heard*: For it is certaine that the *Delation* of *Light* is in an Instant. This may be tried in farre greater Distances, allowing greater *Lights* and *Sounds*.

It is generally knowne and obserued, that *Light*, and the *Object* of *Sight*, moue swifter than *Sound*; For we see the *Flash* of a Peece is scene sooner than the *Noise* is heard. And in Hewing wood, if one be some distance off, he shall see the Arme lifted vp for a second Stroke, before he heare the Noise of the first. And the greater the Distance, the greater is the Preuention: As we see in Thunder which is farre off; where the Lightning Precedeth the Cracke a good space.

Colours, when they represent themselues to the Eye, fade not, nor melt not by Degrees, but appeare still in the same Strength; But *Sounds* melt, and vanish, by little and little. The cause is, for that *Colours* participate nothing with the *Motion* of the *Aire*; but *Sounds* doe. And it is a plaine Argument, that *Sound* participateth of some *Locall Motion*, of the *Aire* (as a Cause *Sine qua non*,) in that, it perisheth so suddenly; For in euery Section, or Impulsion of the *Aire*, the *Aire* doth suddenly restore and reunite it selfe; which the *Water* also doth, but nothing so swiftly.

In the Trialls of the *Passage*, or *Not Passage* of *Sounds*, you must take heed, you mistake not the *Passing By the Sides* of a Body, for the *Passing thorow* a Body: And therefore you must make the *Intercepting* Body very close; For *Sound* will passe thorow a small Chincke.

Where *Sound* passeth thorow a *Hard*, or *Close Body* (as thorow *Water*; thorow a *Wall*; thorow *Metall*, as in Hawkes Bells stopped, &c.) the *Hard*, or *Close Body*, must be but thin and small; For else it deadeth and extinguisheth the *Sound* vterly. And therefore, in the *Experiment* of *Speaking in Aire vnder Water*, the Voice must not be very deep within the *Water*: For then the *Sound* pierceth not. So if you speake on the further side of a *Close Wall*, if the *Wall* be very thicke, you shall not be heard: And if there were an Hogthead empty, whereof the Sides were some two Foot thicke, and the bung hole stopped; I conceiue the *Resounding Sound*, by the *Communication* of the *Outward Aire*, with the *Aire within*, would be little or none; But only you shall heare the *Noise* of the *Outward Knocke*, as if the *Vessell* were full.

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Experiments
in Consort,
touching the
Passage and In-
terceptions of
Sounds.

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It is certaine, that in the *Passage of Sounds*, thorow *Hard Bodies*, the Spirit or Pneumaticall Part of the Hard body it selfe, doth cooperate; But much better, when the Sides of that *Hard Body* are stricke, than when the Percussion is onely within, without Touch of the Sides. Take therefore a Hawkes Bell, the holes stooped vp, and hang it by a threed, within a Bottle Glasse; And stop the Mouth of the Glasse, very close with Wax; And then shake the Glasse, and see whether the Bell giue any *Sound* at all, or how weake? But note, that you must in stead of the Threed take a Wire; Or else let the Glasse haue a great Belly; lest when you shake the Bell, it dash vpon the Sides of the Glasse.

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It is plaine, that a very *Long*, and *Downe-right Arch*, for the *Sound* to passe, will extinguish the *Sound* quite; So that that *Sound*, which would be heard ouer a Wall, will not be heard ouer a Church; Nor that *Sound*, which will be heard, if you stand some distance from the Wall, will be heard if you stand close vnder the Wall.

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Soft and *Foraminous Bodies*, in the *first Creation* of the *Sound*, will dead it; For the Striking against Cloth, or Furre, will make little *Sound*; As hath beene said: But in the *Passage* of the *Sound*, they will admit it better than *Harder Bodies*; As we see, that Curtaines, and Hangings, will not stay the *Sound* much; But Glasse-windowes, if they be very Close, will checke a *Sound* more, than the like Thicknesse of Cloth. Wee see also, in the Rumbling of the Belly, how easily the *Sound* passeth thorow the Guts, and Skin.

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It is worthy the Enquiry, whether *Great Sounds* (As of Ordnance, or Bells) become not more *Weake*, and *Exile*, when they passe thorow *Small Crannies*. For the *Subtilties* of *Articulate Sounds* (it may be) may passe thorow *Small Crannies*, not confused; But the *Magnitude* of the *Sound* (perhaps) not so well.

Experiments
in Consort
touching the
Medium of
Sounds.

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THe *Mediums* of *Sounds* are *Aire*; *Soft* and *Porous Bodies*; Also *Water*. And *Hard Bodies* refuse not altogether, to bee *Mediums* of *Sounds*. But all of them are dull and vnapt *Deferents*, except the *Aire*.

In *Aire*, the Thinner or Drier *Aire*, carrieth not the *Sound* so well, as the more Dense; As appeareth in *Night Sounds*; And *Euening Sounds*; And *Sounds* in moist Weather, and Southerne Winds. The reason is already mentioned in the Title of *Maioration* of *Sounds*; Being for that *Thinne Aire* is better pierced; but *Thicke Aire* preserueth the *Sound* better from Wast; Let further Triall be made by Hollowing in Mists, and Gentle Showers: For (it may be) that will somewhat dead the *Sound*.

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How farre forth *Flame* may be a *Medium* of *Sounds* (especially of such *Sounds* as are created by *Aire*, and not betwixt *Hard Bodies*) let it bee tried, in *Speaking* where a *Bonfire* is betweene; But then you must allow, for some disturbance, the *Noise* that the *Flame* it selfe maketh.

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Whether any other *Liquours*, being made *Mediums*, cause a Diuersity of *Sound* from *Water*, it may be tried: As by the Knapping of the Tongs; Or Striking of the Bottome of a Vessell, filled either with Milk,

or

or with Oyle; which though they be more light, yet are they more vnequall Bodies than Aire.

Of the Natures of the Mediums, we haue now spoken; As for the Disposition of the said Mediums, it doth consist in the Penning, or not Penning of the Aire; Of which wee haue spoken before, in the Title of Delation of Sounds: It consisteth also in the Figure of the Concaue, thorow which it passeth; Of which we will speake next.

How the *Figures* of *Pipes*, or *Concaues*, thorow which *Sounds* passe; Or of other *Bodies deferent*; conduce to the *Varietie* and *Alteration* of the *Sounds*; Either in respect of the *Greater Quantitie*, or *lesse Quantitie* of *Aire*, which the *Concaues* receiue; Or in respect of the *Carrying* of *Sounds* longer or shorter way; Or in respect of many other *Circumstances*; they haue beene touched, as falling into other *Titles*. But those *Figures*, which we now are to speake of, we intend to be, as they concerne the *Lines*, thorow which *Sound* passeth; As *Straight*; *Crooked*; *Angular*; *Circular*; &c.

The *Figure* of a *Bell* partaketh of the *Pyramis*, but yet comming off, and dilating more suddenly. The *Figure* of a *Hunters Horne*, and *Cornet*, is oblique; yet they haue likewise *Straight Hornes*; which if they be of the same *Bore* with the *Oblique*, differ little in *Sound*; Saue that the *Straight* require somewhat a stronger *Blast*. The *Figures* of *Recorders*, and *Flutes*, and *Pipes* are *straight*; But the *Recorder* hath a lesse *Bore*, and a greater; *Above*, and *below*. The *Trumpet* hath the *Figure* of the *Letter S*: which maketh that *Purling Sound*, &c. Generally, the *Straight Line* hath the cleaneest and roundest *Sound*, and the *Crooked* the more *Hoarse*, and *Iarring*.

Of a *Sinuuous Pipe*, that may haue some foure *Flexions*, *Triall* would be made. Likewise of a *Pipe*, made like a *Crosse*, open in the middest. And so likewise of an *Angular Pipe*: And see what will be the *Effects* of these seuerall *Sounds*. And so againe of a *Circular Pipe*; As if you take a *Pipe* perfect Round, and make a *Hole* whereinto you shall blow; And another *Hole* not farre from that; But with a *Trauerse* or *Stop* between them; So that your breath may goe the *Round* of the *Circle*, and come forth at the second *Hole*. You may trie likewise *Percussions* of *Solide Bodies* of seuerall *Figures*; As *Globes*, *Flats*, *Cubes*, *Crosses*, *Triangles*, &c. And their *Combinations*; As *Flat* against *Flat*; And *Connex* against *Conuex*; And *Conuex* against *Flat*, &c. And marke well the diuersities of the *Sounds*. Trie also the difference in *Sound* of seuerall *Crafftitudes* of *Hard Bodies* percussed; And take knowledge of the diuersities of the *Sounds*. I my selfe haue tried, that a *Bell* of *Gold* yeeldeth an excellent *Sound*, not inferiour to that of *Siluer*, or *Brasse*, but rather better: yet we see that a

Experiments
in Consort,
what the Fi-
gures of the
Pipes, or Con-
caues, or the
Bodies Deferent
conduce to the
Sounds.

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peece

peece of Money of Gold foundeth farre more flat than a peece of Money of Silver,

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The *Harpe* hath the *Concane*, not along the *Strings*, but acrosse the *Strings*; And no *Instrument* hath the *Sound* so Melting, and Prolonged, as the *Irish Harpe*. So as I suppose, that if a *Virginal* were made with a double *Concane*; the one all the length as the *Virginal* hath; the other at the End of the *Strings*, as the *Harpe* hath; It must needs make the *Sound* perfecter, and not so Shallow, and farring. You may trie it, without any *Sound-Board* along, but only *Harpe-wile*, at one end of the *Strings*: Or lastly with a double *Concane*, at Each end of the *Strings* one.

Experiments
in Consort,
touching the
Mixture of
Sound.

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Here is an apparent Diuersitie between the *Species Visible*, and *Audible*, in this; That the *Visible* doth not mingle in the *Medium*, but the *Audible* doth. For if we looke abroad, we see Heaven, a number of Starres, Trees, Hills, Men, Beasts, at once. And the *Species* of the one doth not confound the other. But if so many sounds came from seuerall Parts, one of them would vterly confound the other. So we see, that *Voices* or *Consorts* of *Musicke* doe make an Harmony by *Mixture*, which *Colours* doe not. It is true neuerthelesse, that a great *Light* drowneth a smaller, that it cannot be seene; As the *Sunne* that of a *Gloworme*; as well as a Great *Sound* drowneth a lesser. And I suppose likewise, that if there were two *Lanthornes* of *Glasse*, the one a *Crimsin*, and the other an *Azure*, and a *Candle* within either of them, those *Coloured Lights* would mingle, and cast vpon a *White Paper* a *Purple Colour*. And euen in *Colours*, they yeeld a faint and weake *Mixture*: For white walls make *Roomes* more lightsome than blacke, &c. But the Cause of the *Confusion* in *Sounds*, and the *Inconfusion* in *Species Visible*, is, For that the *Sight* worketh in *Right Lines*, and maketh seuerall *Cones*; And so there can be no *Coincidence* in the *Eye*, or *Visuall Point*: But *Sounds*, that moue in *Oblique* and *Arcuate Lines*, must needs encounter, and disturbe the one the other.

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The sweetest and best *Harmony* is, when euery *Part*, or *Instrument*, is not heard by it selfe, but a *Conflation* of them all; Which requireth to stand some distance off. Euen as it is in the *Mixture* of *Perfumes*; Or the Taking of the *Smells* of seuerall *Flowers* in the *Aire*.

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The *Disposition* of the *Aire*, in other *Qualities*, except it be ioyned with *Sound*, hath no great Operation vpon *Sounds*: For whether the *Aire* be lightsome or darke, hot or cold, quiet or stirring, (except it be with *Noise*) sweet-smelling, or stinking, or the like; it importeth not much: Some petty Alteration or difference it may make.

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But *Sounds* doe disturbe and alter the one the other: Sometimes the one drowning the other, and making it not heard; Sometimes the one larring and discording with the other, and making a *Confusion*; Sometimes the one Mingling and Compounding with the other, and making an *Harmony*.

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Two *Voices* of like loudnesse, will not be heard, twice as farre, as one of

of them alone; And two *Candles* of like light, will not make Things seene twice as farre off, as one. The Cause is profound; But it seemeth that the *Impressions* from the *Objects* of the *Senses*, doe *minge* respectiue-ly, euery one with his kinde; But not in proportion, as is before demonstrated: And the reason may be, because the first *Impression*, which is from *Prinative* to *Active*, (As from *Silence* to *Noise*, or from *Darknesse* to *Light*,) is a greater Degree, than from *Lesse Noise*, to *More Noise*, or from *Lesse Light*, to *More Light*. And the Reason of that againe may be; For that the *Aire*, after it hath receiued a Charge, doth not receiue a Surcharge, or greater Charge, with like Appetite, as it doth the first Charge. As for the Encrease of Vertue, generally, what Proportion it beareth to the Encrease of the Matter, it is a large Field, and to be handled by it selfe.

ALL *Reflexions* Concurrent doe make *Sounds* Greater; But if the Body that createth, either, the Originall *Sound*, or the *Reflexion*, be cleane and smooth, it maketh them Sweeter. Triall may be made of a *Lute*, or *Violl*, with be Belly of polished Brasse, instead of Wood. We see that euery in the open *Aire*, the *Wire String* is sweeter, than the *String* of *Guts*. And we see that for *Reflexion*, *Water* excelleth; As in *Musicke* neare the *Water*; Or in *Eccho's*.

It hath beene tried, that a *Pipe* a little moistned on the inside, but yet so as there be no Drops left, maketh a more solemne *Sound*, than if the *Pipe* were drie: But yet with a sweet degree of *Sibillation*, or *Purling*; As we touched it before in the title of *Equalitie*. The Cause is, for that all Things Porous, being superficially wet, and (as it were) betweene drie and wet, become a little more Euen and Smooth; But the *Purling*, (which must needs proceed of *Inequalitie*,) I take to be bred betweene the Smoothnesse of the inward Surface of the *Pipe*, which is wet; And the Rest of the Wood of the *Pipe*, vnto which the Wet commeth not, but it remaineth drie.

In *Frostie* weather, *Musicke* within doores soundeth better. Which may be, by reason, not of the Disposition of the *Aire*, but of the *Wood* or *String* of the *Instrument*, which is made more Crispe, and so more porous and hollow: And wee see that *Old Lutes* sound better than *New*, for the same reason. And so doe *Lute-strings* that haue beene kept long.

Sound is likewise *Meliorated* by the *Mingling* of open *Aire* with *Pent Aire*; Therefore Triall may be made, of a *Lute* or *Violl* with a double Belly; Making another Belly with a Knot ouer the Strings; yet so, as there be Roome enough for the Strings, and Roome enough to play below that Belly. Triall may be made also of an *Irish Harpe*, with a Concaue on both Sides; Whereas it useth to haue it but on one Side. The doubt may be, lest it should make too much Resounding; whereby one Note would ouertake another.

If you sing into the Hole of a *Drumme*, it maketh the *Singing* more sweet.

Experiments
in Consort tou-
ching *Meliora-
tion* of *Sounds*.

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sweet. And so I conceiue it would, if it were a *Song* in Parts, sung into feuerall *Drums*; And for handsonnesse and strangeness sake, it would not be amisse to haue a Curtaine betweene the Place where the *Drums* are, and the *Hearers*.

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When a *Sound* is created in a *Wind-Instrument*, betweene the *Breath* and the *Aire*, yet if the *Sound* be communicate with a more equall Bodie of the *Pipe*, it *meliorateth* the *Sound*. For (no doubt) there would be a differing *Sound* in a *Trumpet*, or *Pipe* of *Wood*; And againe in a *Trumpet* or *Pipe* of *Brasse*. It were good to trie *Recorders* and *Hunters Hornes* of *Brasse*, what the *Sound* would be.

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Sounds are *meliorated* by the *Intension* of the *Sense*; where the *Common Sense* is collected most, to the *particular Sense* of *Hearing*, and the *Sight* suspended: And therefore, *Sounds* are sweeter, (as well as greater,) in the *Night*, than in the *Day*; And I suppose, they are sweeter to blinde Men, than to Others: And it is manifest, that betweene *Sleeping* and *Waking*, (when all the *Senses* are bound and suspended) *Musicke* is farre sweeter, than when one is *fully Waking*.

Experiments
in Confort tou-
ching the Imit-
ation of Sounds

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IT is a Thing strange in Nature, when it is attentiuely considered; How *Children*, and some *Birds*, learne to *imitate Speech*. They take no Marke (at all) of the *Motion* of the *Mouth* of Him that speaketh; For *Birds* are as well taught in the Darke, as by Light. The *Sounds* of *Speech* are very Curious and Exquisite: So one would thinke it were a Lesson hard to learne. It is true, that it is done with time, and by little and little, and with many Essayes and Proffers: But all this dischargeth not the Wonder. It would make a Man thinke (though this which we shall say may seeme exceeding strange) that there is some *Transmission* of *Spirits*; and that the *Spirits* of the *Teacher* put in Motion, should worke with the *Spirits* of the *Learner*, a Pre-disposition to offer to *Imitate*; And so to perfect the *Imitation* by degrees. But touching *Operations* by *Transmissions* of *Spirits*, (which is one of the highest Secrets in Nature,) we shall speake in due place; Chiefly when wee come to enquire of *Imagination*. But as for *Imitation*, it is certaine, that there is in Men, and other Creatures, a predisposition to *Imitate*. Wee see how readie Apes and Monkeys are, to *imitate* all *Motions* of Man: And in the Catching of Dottrells, we see, how the Foolish Bird playeth the Ape in Gestures: And no Man (in effect) doth accompany with others, but hee learneth, (ere he is aware,) some Gesture, or Voice, or Fashion of the other.

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In *Imitation* of *Sounds*, that *Man* should be the *Teacher*, is no Part of the Matter; For *Birds* will learne one of another; And there is no Reward, by feeding, or the like, giuen them for the *Imitation*; And besides, you shall haue Parrots, that will not only *imitate* Voyces, but Laughing, Knocking, Squeaking of a Doore vpon the Hinges, or of a Cart-wheele; And (in effect) any other *Noise* they heare.

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No *Beast* can *imitate* the *Speech* of *Man*, but *Birds* onely; For the Ape
it

it selfe, that is so ready to *imitate* otherwise, attaineth not any degree of *Imitation* of Speech. It is true, that I haue knowne a Dog, that if one howled in his Eare, he would fall a howling a great while: What should be the Aptnesse of *Birds*, in comparison of *Beasts*, to *imitate* the Speech of *Man*, may be further enquired. We see that *Beasts* haue those Parts, which they count the *Instruments* of Speech, (as *Lips, Teeth, &c.*) liker vnto *Man*, than *Birds*. As for the *Necke*, by which the *Throat* passeth, we see many *Beasts* haue it, for the Length, as much as *Birds*. What better Gorge, or Attire, *Birds* haue, may be further enquired. The *Birds* that are knowne to be Speakers, are *Parrots, Pyes, Jayes, Daves, and Ravens*. Of which, *Parrots* haue an adunque Bill, but the rest not.

But I conceiue, that the Aptnesse of *Birds*, is not so much in the Conformity of the Organs of Speech, as in their Attention. For Speech must come by *Hearing* and *Learning*; And *Birds* giue more heed, and marke Sounds, more than *Beasts*; because naturally they are more delighted with them, and practise them more; As appeareth in their *Singing*. We see also, that those that teach *Birds* to sing, doe keep them Waking, to increase their Attention. We see also, that *Cock-Birds*, amongst *Singing-Birds*, are euer the better *Singers*; which may be, because they are more liuely, and listen more.

Labour, and Intention to *imitate* voices, doth conduce much to *Imitation*: And therefore we see, that there be certaine *Pantomimi*, that will represent the voices of *Players* of *Enterludes*, so to life, as if you see them not, you would thinke they were those *Players* themselues; And so the Voices of other *Men* that they heare.

There haue beene some, that could counterfeit the Distance of Voices (which is a *Secondary Object* of *Hearing*) in such sort; As when they stand fast by you, you would thinke the Speech came from a farre off, in a fearefull manner. How this is done, may be further enquired. But I see no great vse of it, but for Imposture, in counterfeiting Ghosts or Spirits.

There be three Kinds of Reflexions of Sounds; A Reflexion Concurrent; A Reflexion Iterant, which we call *Eccho*; And a Super-reflexion, or an *Eccho* of an *Eccho*, whereof the first hath beene handled in the Title of Magnitude of Sounds: The Latter two we will now speake of.

The Reflexion of Species Visible, by Mirrours, you may command; Because passing in Right Lines, they may be guided to any Point: But the Reflexion of Sounds is hard to master; Because the Sound filling great Spaces in Arched Lines, cannot be so guided: And therefore we see there hath not beene practised, any Meanes to make Artificiall *Eccho's*. And no *Eccho* already knowne returneth in a very narrow Roome.

The Naturall *Eccho's* are made vpon Walls, Woods, Rockes, Hills, and Bankes; As for Waters, being neere, they make a Concurrent *Eccho*; But being

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being further off (as vpon a large *Riuer*) they make an *Iterant Echo*: For there is no difference betweene the *Concurrent Echo*, and the *Iterant*, but the Quicknesse, or Slownesse of the Returne. But there is no doubt, but *Water* doth help the *Delation* of *Eccho*; as well as it helpeth the *Delation* of *Originall Sounds*.

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It is certaine (as hath beene formerly touched,) that if you speake thorow a *Trunke*, stopped at the further end, you shall finde a Blast returne vpon your Mouth, but no *Sound* at all. The *Cause* is, for that the *Closenesse*, which preserueth the *Originall*, is not able to preserue the *Reflected Sound*: Besides that *Eccho's* are seldome created but by loud *Sounds*. And therefore there is lesse hope of *Artificiall Echoes* in *Aire*, pent in a narrow Concaue. Neuerthelesse it hath bin tried, that One leaning ouer a *Well*, of 25. Fathome deep, and speaking, though but softly, (yet not so soft as a whisper) the *Water* returned a good *Audible Echo*. It would be tried, whether Speaking in *Cauces*, where there is no Issue, saue where you speake, will not yeeld *Eccho's*, as *Wells* doe.

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The *Eccho* commeth as the *Originall Sound* doth, in a Round Orbe of *Aire*: It were good to try the Creating of the *Eccho*, where the Body Repercussing maketh an Angle: As against the Returne of a Wall, &c. Also we see that in *Mirrors*, there is the like Angle of Incidence, from the Obiect to the Glasse, and from the Glasse to the Eye. And if you strike a *Ball* side-long, not full vpon the Surface, the Rebound will be as much the contrary way; Whether there be any such *Resilience* in *Eccho's*, (that is, whether a Man shall heare better, if he stand aside the Body Repercussing, than if he stand where he speaketh, or any where in a right Line betweene;) may be tried. Triall likewise would be made, by standing neerer the Place of Repercussing, than hee that speaketh; And againe by standing further off, than hee that speaketh; And so Knowledge would be taken, whether *Eccho's*, as well as *Originall Sounds*, be not strongest neere hand.

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There be many Places, where you shall heare a Number of *Eccho's*, one after another: And it is when there is variety of *Hills* or *Woods*, some neerer, some further off: So that the Returne from the further, being last created, will be likewise last heard.

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As the *Voice* goeth round, as well towards the Backe, as towards the Front of him that speaketh; So likewise doth the *Eccho*; For you haue many Back-*Eccho's* to the Place where you stand.

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To make an *Eccho*, that will report, three, or foure, or fiae Words, distinctly, it is requisite, that the Body Repercussing, be a good distance off: For if it be neere, and yet not so neere, as to make a *Concurrent Echo*, it choppeth with you vpon the sudden. It is requisite likewise, that the *Aire* be not much pent. For *Aire*, at a great distance, pent, worketh the same effect with *Aire*, at large, in a small distance. And therefore in the Triall of Speaking in the *Well*, though the *Well* was deepe, the *Voice* came backe, suddenly; And would beare the Report but of two Words.

For

For *Eccho's* vpon *Eccho's*, there is a rare Instance thereof in a Place, which I will now exactly describe. It is some three or foure Miles from *Paris*, neere a Towne called *Pont-charenton*; And some Bird-bolt shot, or more, from the Riuer of *Seane*. The Roome is a *Chappell*, or small *Church*. The Walls all standing, both at the Sides, and at the Ends. Two Rowes of Pillars, after the manner of Isles of *Churches*, also standing; The Roofe all open, not so much as any Embowment neere any of the walls left. There was against euery Pillar, a Stacke of Billets, aboue a Mans Height; which the Watermen, that bring Wood downe the *Seane* in Stacks, and not in Boats, laid there (as it seemeth) for their ease. Speaking at the one End, I did heare it retorne the Voice thirteene seuerall times; And I haue heard of others, that it would retorne sixteene times: For I was there about three of the Clocke in the Afternoone: And it is best (as all other *Eccho's* are) in the Euening. It is manifest, that it is not *Eccho's* from seuerall places, but a *Tasting* of the Voice, as a Ball, to and fro; Like to *Reflexions* in *Looking-Glasses*; where if you place one *Glasse* before, and another behind, you shall see the *Glasse* behind with the *Image*, within the *Glasse* before; And againe, the *Glasse* before in that; and diuers such *Super-Reflexions*, till the *species speciei* at last die. For it is euery Returne weaker, and more shady. In like manner, the Voice in that *Chappell*, createth *speciem speciei*, and maketh succeeding *Super-Reflexions*; For it melteth by degrees, and euery *Reflexion* is weaker than the former: So that, if you speak three Words, it will (perhaps) some three times report you the whole three Words; And then the two latter Words for some times; And then the last Word alone for some times; Still fading and growing weaker. And whereas in *Eccho's* of one Returne, it is much to heare foure or fise Words; In this *Eccho* of so many Returnes, vpon the matter, you heare aboue twenty Words for three.

The like *Eccho* vpon *Eccho*, but onely with two Reports, hath beene obserued to be, if you stand betweene a *House*, and a *Hill*, and lure towards the *Hill*. For the *House* will giue a *Back-Eccho*; One taking it from the other, and the latter the weaker.

There are certaine *Letters*, that an *Eccho* will hardly expresse; As *S*, for one; Especially being Principiall in a Word. I remember well, that when I went to the *Eccho* at *Pont-Charenton*, there was an Old *Parisian*, that tooke it to be the Worke of Spirits, and of good Spirits. For (said he) call *Satan*, and the *Eccho* will not deliuer backe the Deuils name; But will say, *Vat'en*; Which is as much in *French*, as *Apage*, or *Auoid*. And thereby I did hap to finde, that an *Eccho* would not retorne *S*, being but a Hissing and an *Interior Sound*.

Eccho's are some more sudden, and chop againe, as soone as the Voice is deliuered; As hath beene partly said: Others are more deliberate, that is, giue more Space betweene the Voice and the *Eccho*, which is caused by the locall Nearenesse, or Distance: Some will report a longer Traine of Words; And some a shorter: Some more loud (full as loud as the Ori-

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ginall, and sometimes more loud;) And some weaker and fainter.

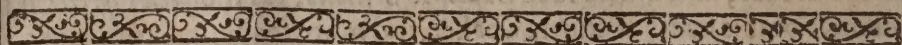
Where *Eccho's* come from severall Parts, at the same distance, they must needs make (as it were) a Quire of *Eccho's*, and so make the Report greater, and euen a *Continued Eccho*; which you shall find in some *Hills*, that stand encompassed, Theater-like.

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It doth not yet appeare, that there is *Refraction* in *Sounds*, as well as in *Species Visible*. For I do not think, that if a *Sound* should passe through diuers *Mediums*, (as *Aire, Cloth, Wood*) it would deliuer the *Sound*, in a differing Place, from that vnto which it is deferred; which is the Proper Effect of *Refraction*. But *Maioration*, which is also the Worke of *Refraction*, appeareth plainly in *Sounds* (as hath beene handled at full;) But it is not by Diuersity of *Mediums*.

Experiments
in Confort
touching the
Consent and
Dissent between
Visibles and
Audibles.

We haue *obiter*, for Demonstrations sake, vsed in diuers *Instances*, the *Examples* of the *Sight*, and *Things Visible*, to illustrate the *Nature* of *Sounds*. But we thinke good now to prosecute that *Comparison* more fully.



CONSENT OF VISIBLES, and Audibles.

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Both of them spread themselves in Round, and fill a whole Floare or Orbe, vnto certaine Limits: And are carried a great way: And doe languish and lessen by degrees, according to the Distance of the Obiects from the Sensories.

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Both of them haue the whole *Species* in euery small Portion of the *Aire*, or *Medium*; So as the *Species* doe passe through small Crannies, without Confusion: As we see ordinarily in *Lenels*, as to the *Eye*; And in *Crannies*, or *Chinks*, as to the *Sound*.

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Both of them are of a sudden and easie Generation and Delation; And likewise perish swiftly, and suddenly; As if you remoue the *Light*; Or touch the *Bodies* that giue the *Sound*.

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Both of them doe receiue and carry exquisite and accurate Differences; As of Colours, Figures, Motions, Distances, in *Visibles*; And of Articulate Voices, Tones, Songs, and Quauerings, in *Audibles*.

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Both of them in their Vertue and Working, doe not appeare to emit any Corporall Substance into their *Mediums*, or the Orbe of their Vertue; Neither againe to raise or stir any euident locall Motion in their *Mediums*, as they passe; but onely to carry certaine Spirituall Species; The perfect Knowledge of the Cause whereof, being hitherto scarcely attained, we shall search and handle in due place.

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Both of them seeme not to generate or produce any other Effect in Nature,

ture, but such as appertaineth to their proper Obiects, and Senses, and are otherwise Barren.

But *Both* of them in their owne proper Action, doe worke three manifest Effects. The first, in that the *Stronger Species drowneth the Lesser*; As the Light of the Sunne, the light of a Glow-worme; The Report of an Ordnance, the Voice: The Second, in that an *Obiect of Surcharge or Excesse destroyeth the Sense*; As the Light of the Sunne the Eye, a violent Sound (neere the Eare) the Hearing: The Third, in that *both of them will be reuerberate*; As in *Mirroures*; And in *Eccho's*.

Neither of them doth *destroy or hinder the Species of the other*, although they encounter in the same Medium; As Light or Colour hinder not Sound; Nor *è contrà*.

Both of them affect the Sense in *Living Creatures*, and yeeld Obiects of Pleasure and Dislike: Yet neuerthelesse, the Obiects of them doe also (if it be well obserued) affect and worke vpon dead Things; Namely, such as haue some Conformity with the *Organs* of the two Senses; As *Visibles* worke vpon a *Looking-Glasse*, which is like the Pupill of the Eye; And *Audibles* vpon the Places of *Eccho*, which resemble, in some sort, the *Cauerne* and structure of the Eare.

Both of them doe diuersly worke, as they haue their Medium diuersly disposed. So a Trembling Medium (as Smoake) maketh the Obiect seeme to tremble; and a Rising or Falling Medium (as Winds) maketh the Sounds to rise, or fall.

To *Both*, the Medium, which is the most Propitious and Conducibile; is *Aire*; For *Glasse* or *Water*, &c. are not comparable.

In *Both* of them, where the Obiect is *Fine and Accurate*, it conduceth much to haue the Sense *Intentive, and Erect*; In so much as you contract your Eye, when you would see sharply; And erect your Eare, when you would heare attentiuely; which in Beasts that haue Eares moueable, is most manifest.

The Beames of Light, when they are multiplied and conglomerate, generate Heat; which is a different Action, from the Action of Sight: And the Multiplication and Conglomeration of Sounds doth generate an extreme Rarefaction of the Aire; which is an Action materiare, differing from the Action of Sound; If it be true (which is anciently reported) that *Birds*, with great shouts, haue fallen downe.

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DISSENTS OF VISIBLES, and Audibles.

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THe *Species* of *Visibles* seeme to be *Emissions* of *Beames* from the *Obiect* scene; Almost like *Odours*; saue that they are more *Incorporeall*: But the *Species* of *Audibles* seeme to Participate more with *Locall Motion*, like *Percussions* or *Impressions* made vpon the *Aire*. So that whereas all *Bodies* doe seeme to worke in two manners; Either by the *Communication* of their *Natures*; Or by the *Impressions* and *Signatures* of their *Motions*; The *Diffusion* of *Species Visible* seemeth to participate more of the former *Operation*; and the *Species Audible* of the latter.

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The *Species* of *Audibles* seeme to be carried more manifestly thorow the *Aire*, than the *Species* of *Visibles*: For (I conceiue) that a Contrary strong Wind will not much hinder the Sight of *Visibles*, as it will doe the Hearing of *Sounds*.

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There is one *Difference*, aboue all others, betweene *Visibles* and *Audibles*, that is the most remarkable; As that whereupon many smaller Differences doe depend: Namely, that *Visibles*, (except *Lights*,) are carried in *Right Lines*; and *Audibles* in *Arcuate Lines*. Hence it commeth to passe, that *Visibles* doe not intermingle, and confound one another, as hath beene said before; But *Sounds* doe. Hence it commeth, that the Solidity of *Bodies* doth not much hinder the Sight, so that the *Bodies* be cleare, and the Pores in a *Right Line*, as in *Glasse*, *CrySTALL*, *Diamonds*, *Water*, &c. But a thin *Scarfe*, or *Handkerchiefe*, though they be *Bodies* nothing so Solid, hinder the Sight: Whereas (contrariwise) these *Porous Bodies* doe not much hinder the Hearing, but solid *Bodies* doe almost stop it, or at the least attenuate it. Hence also it commeth, that to the *Reflexion* of *Visibles*, small *Glasses* suffice; but to the *Reuerberation* of *Audibles*, are required greater Spaces, as hath likewise beene said before.

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Visibles are scene further off, than *Sounds* are heard; Allowing neuertheless the *Rate* of their *Bignesse*: For otherwise a great *Sound* will bee heard further off, than a *Small Body* scene.

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Visibles require (generally) some *Distance* betweene the *Obiect*, and the *Eye*, to bee better scene; Whereas in *Audibles*, the neerer the Approach of the *Sound* is to the *Sense*, the better. But in this there may be a double Error. The one, because to *Seeing*, there is required *Light*; And any thing that toucheth the *Pupill* of the *Eye* (all ouer) excludeth the *Light*. For I haue heard of a Person very credible (who himselfe was cured

cured of a Cataract in one of his Eyes) that while the Silver Needle did worke vpon the Sight of his Eye, to remoue the Filme of the Cataract, he neuer saw any thing more cleere or perfect, than that white Needle: Which (no doubt) was, because the Needle was lesser than the *Pupill* of the Eye, and so tooke not the Light from it. The other Error may be, for that the *Object* of *Sight* doth strike vpon the *Pupill* of the Eye, directly without any interception; whereas the *Cane* of the *Eare* doth hold off the *Sound* a little from the Organ: And so neuerthelesse there is some *Distance* required in both.

Visibles are swifter carried to the *Sense*, than *Audibles*; As appeareth in Thunder and Lightning; Flame and Report of a Peece; Motion of the Aire in Hewing of Wood. All which haue beene set downe heretofore, but are proper for this *Title*.

I conceiue also, that the *Species* of *Audibles* doe hang longer in the Aire, than those of *Visibles*: For although euen those of *Visibles*, doe hang some time, as we see in *Rings turned*, that shew like Spheres; In *Lute-strings* fillipped; A *Fire-brand* carried along, which leaueth a Traine of Light behinde it; and in the *Twilight*; And the like: Yet I conceiue that *Sounds* stay longer, because they are carried vp and downe with the Winde: And because of the Distance of the Time in *Ordinance discharged*, and heard twenty Miles off.

In *Visibles*, there are not found *Objects* so odious and ingrate to the *Sense*, as in *Audibles*. For foule *Sights* doe rather displease, in that they excite the Memory of foule Things, than in the immediate *Objects*. And therefore in *Pictures*, those foule *Sights* doe not much offend; But in *Audibles*, the Grating of a Saw, when it is sharpned, doth offend so much, as it setteth the Teeth on Edge. And any of the *harsh Discords* in *Musicke*, the Eare doth straight-waies refuse.

In *Visibles*, after great Light, if you come suddenly into the *Darke*; Or contrariwise, out of the *Darke* into a *Glaring light*, the Eye is dazled for a time, and the *Sight* confused; But whether any such Effect be after great *Sounds*, or after a *deepe Silence*, may be better enquired. It is an old Tradition, that those that dwell neere the *Cataracts* of *Nilus*, are stricken deafe: But we finde no such effect, in Cannoniers, nor Millers, nor those that dwell vpon Bridges.

It seemeth that the *Impression* of *Colour* is so weake, as it worketh not but by a Cone of Direct *Beames*, or Right Lines; whereof the Basis is in the *Object*, and the Verricall Point in the Eye; So as there is a Corradiation and Coniunction of *Beames*; And those *Beames* so sent forth, yet are not of any force to beget the like borrowed or second *Beames*, except it be by *Reflexion*, whereof we speake nor. For the *Beames* passe, and giue little Tincture to that Aire, which is Adiacent; which if they did, we should see *Colours* out of a Right line. But as this is in *Colours*, so otherwise it is in the *Body of Light*. For when there is a Skreene betweene the Candle and the Eye, yet the *Light* passeth to the Paper wheron One writeth; So that the *Light* is seene, where the *Body* of the *Flame* is not

scene; And where any *Colour* (if it were placed where the Body of the *Flame* is) would not be scene. I iudge that *Sound* is of this Latter Nature: For when two are placed on both sides of a Wall, and the Voice is heard, I iudge it is not onely the *Originall Sound*, which passeth in an *Arched Line*; But the *Sound*, which passeth about the Wall in a Right Line, begetteth the like Motion round about it, as the first did, though more weake.

Experiments
in Consort,
touching the
Sympathy or
Antipathy of
Sounds, one
with another.

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ALL *Concords* and *Discords* of *Musicke*, are, (no doubt) *Sympathies*, and *Antipathies* of *Sounds*. And so (likewise) in that *Musicke*, which wee call *Broken Musicke*, or *Consort Musicke*; Some *Consorts* of *Instruments* are sweeter than others; (A Thing not sufficiently yet obserued:) As the *Irish Harpe*, and *Base Viall* agree well: The *Recorder* and *Stringed Musicke* agree well: *Organs* and the *Voice* agree well; &c. But the *Virginalls* and the *Lute*; Or the *Welsh-Harpe*, and *Irish Harpe*; Or the *Voice* and *Pipes* alone, agree not so well; But for the *Melioration* of *Musicke*, there is yet much left (in this Point of *Exquisite Consorts*) to try and enquire.

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There is a Common Obseruation, that if a *Lute*, or *Viall*, be layed vpon the Backe, with a small Straw vpon one of the *Strings*; And another *Lute* or *Viall* bee laid by it; And in the other *Lute* or *Viall*, the *Vnison* to that *String* be stricken; it will make the *String* moue; Which will appeare both to the Eye, and by the *Strawes* falling off. The like will bee, if the *Diapason* or *Eight* to that *String* be stricken, either in the same *Lute* or *Viall*, or in others lying by; But in none of these there is any Report of *Sound*, that can be discerned, but only Motion.

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It was deuised, that a *Viall* should haue a Lay of Wire Strings below, as close to the Belly, as a *Lute*; And then the *Strings* of Guts mounted vpon a Bridge, as in Ordinary *Vialls*; To the end, that by this means, the vpper *Strings* stricken, should make the lower resound by *Sympathy*, and so make the *Musicke* the better; Which, if it be to purpose, then *Sympathy* worketh, as well by Report of *Sound*, as by *Motion*. But this deuice I conceiue to be of no vse; because the vpper *Strings*, which are stopped in great variety, cannot maintaine a *Diapason* or *Vnison*, with the Lower, which are neuer stopped. But if it should be of vse at all; it must be in *Instruments* which haue no Stops; as *Virginalls*, and *Harpes*; wherein triall may be made of two Rowes of Strings, distant the one from the other.

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The Experiment of *Sympathy* may be transferred (perhaps) from *Instruments* of *Strings*, to other *Instruments* of *Sound*. As to try if there were in one Steeple, two Bells of *Vnison*, whether the striking of the one would moue the other, more than if it were another Accord: And so in *Pipes* (if they be of equall Bore, and *Sound*) whether a little Straw or Feather would moue in the one *Pipe*, when the other is blowne at an *Vnison*.

It

It seemeth, both in *Eare*, and *Eye*, the *Instrument* of *Sense* hath a *Sympathy* or *Similitude* with that which giueth the *Reflexion*; (As hath beene touched before.) For as the *Sight* of the *Eye* is like a *Cryftall*, or *Glasse*, or *Water*; So is the *Eare* a *finuous Caue*, with a *hard Bone*, to stop and reuerberate the *Sound*: Which is like to the *Places* that report *Eccho's*.

When a Man *Tawneth*, he cannot *Heare* so well. The *Cause* is, for that the *Membrane* of the *Eare* is extended; And so rather casteth off the *Sound*, than draweth it to.

We *Heare* better when we *hold our Breath*, than contrary; In so much as in all *Listening* to attaine a *Sound* a *farre off*, Men *hold their Breath*. The *Cause* is, For that in all *Expiration*, the *Motion* is *Outwards*; And therefore, rather driueth away the voice, than draweth it: And besides we see, that in all *Labour* to doe things with any strength, we *hold the Breath*: And *listening* after any *Sound*, that is heard with difficulty, is a kinde of *Labour*.

Let it be tried, for the *Helpe* of the *Hearing*, (and I conceiue it likely to succeed,) to make an *Instrument* like a *Tunnell*; The narrow Part whereof may be of the *Bignesse* of the *Hole* of the *Eare*; And the *Broader End* much larger, like a *Bell* at the *Skirts*; And the length halfe a foot, or more. And let the narrow end of it be set close to the *Eare*: And marke whether any *Sound*, abroad in the open *Aire*, will not be heard distinctly, from further distance, than without that *Instrument*; being (as it were) an *Eare-Spectacle*. And I haue heard there is in *Spaine*, an *Instrument* in vse to be set to the *Eare*, that *helpeth* somewhat those that are *Thicke* of *Hearing*.

If the *Mouth* bee shut close, neuerthelesse there is yeelded by the *Roofe* of the *Mouth*, a *Murmur*. Such as is vsed by dumbe Men: But if the *Nostrills* be likewise stopped, no such *Murmur* can be made; Except it be in the *Bottom* of the *Pallate* towards the *Throat*. Whereby it appeareth manifestly, that a *Sound* in the *Mouth*, except such as afore-said, if the *Mouth* bee stopped, passeth from the *Pallat*, thorow the *Nostrills*.

The *Repercussion* of *Sounds*, (which wee call *Eccho*;) is a great Argument of the *Spiritual Essence* of *Sounds*. For if it were *Corporall*, the *Repercussion* should be created in the same manner, and by like *Instruments*, with the *Originall Sound*: But we see what a Number of *Exquisite Instruments* must concur in *Speaking* of *Words*, whereof there is no such Matter in the *Returning* of them; But only a plaine *Stop*, and *Repercussion*.

The *Exquisite Differences* of *Articulate Sounds*, carried along in the *Aire*, shew that they cannot be *Signatures* or *Impressions* in the *Aire*, as hath beene well refuted by the *Ancients*. For it is true, that *Seales* make excellent *Impressions*: And so it may be thought of *Sounds* in their

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Experiments
in Consort tou-
ching the Hin-
dering or Hel-
ping of the Hea-
ring.

Experiments
in Consort,
touching the
Spiritual and
Fine Nature of
Sounds.

their first Generation: But then the *Delation* and *Continuance* of them without any new Sealing, shew apparently they cannot bee Impressions.

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All *Sounds* are suddenly made, and doe suddenly perish; But neither that, nor the *Exquisite Differences* of them, is Matter of so great Admiration: For the Quauerings, and Warblings in Lutes, and Pipes, are as swift; And the Tongue, (which is no very fine Instrument,) doth in Speech, make no fewer Motions, than there be Letters in all the Words, which are vttered. But that *Sounds* should not only be so speedily generated, but carried so farre euery way, in such a momentanie time, deserueth more Admiration. As for Example; If a Man stand in the middle of a Field, and speake aloud, he shall be heard a Furlong in round; And that shall be in *Articulate Sounds*; And those shall be Entire in euery little Portion of the *Aire*; And this shall be done in the Space of lesse than a Minute.

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The *Sudden Generation* and *Perishing* of *Sounds*, must be one of these two Wayes. Either that the *Aire* suffereth some Force by *Sound*; and then restoreth it selfe; As Water doth; Which being diuided, maketh many Circles, till it restore it selfe to the naturall Consistence: Or otherwise, that the *Aire* doth willingly imbibe the *Sound* as gratefull, but cannot maintaine it; For that the *Aire* hath (as it should seeme) a secret and hidden Appetite of Receiuing the *Sound* at the first; But then other Grosse and more Materiate Qualities of the *Aire* straightwayes suffocate it; Like vnto *Flame*, which is generated with Alacritie, but straight quenched by the Enmitie of the *Aire*, or other Ambient Bodies.

There be these *Differences* (in generall) by which *Sounds* are diuided; 1. *Musicall*, *Immusicall*; 2. *Treble*, *Base*; 3. *Flat*, *Sharpe*; 4. *Soft*, *Loud*; 5. *Exteriour*, *Interiour*; 6. *Cleane*, *Harsh* or *Purling*; 7. *Articulate*, *Inarticulate*.

We haue laboured (as may appeare,) in this *Inquisition* of *Sounds*, diligently; Both because *Sound* is one of the most Hidden Portions of *Nature*, (as we said in the beginning:) And because it is a *Vertue* which may be called *Incorporeall*, and *Immateriate*; whereof there be in *Nature* but few. Besides, we were willing, (now in these our first Centuries,) to make a Patterne or President of an *Exact Inquisition*; And we shall doe the like hereafter in some other Subiects which require it. For wee desire that Men should learne and perceiue, how seuer a Thing the true *Inquisition* of *Nature* is; And should accustome

custome themselves, by the light of Particulars, to enlarge their Mindes, to the Amplitude of the world; And not reduce the World to the Narrowness of their Mindes.

Metalls giue *Orient* and *Fine Colours* in *Dissolutions*; As *Gold* giueth an excellent *Yellow*; *Quick-Siluer* an excellent *Green*; *Tin* giueth an excellent *Azure*: Likewise in their *Putrefactions*, or *Rusts*; As *Vermilion*, *Verdegrease*, *Bise*, *Cirrus*, &c. And likewise in their *Vitrifications*. The Cause is, for that by their Strength of Body, they are able to endure the Fire, or Strong Waters, and to be put into an Equall Posture; And againe to retaine Part of their principall Spirit; Which two Things, (Equall Posture, and Quicke Spirits) are required chiefly, to make Colours lightsome.

IT conduceth vnto *Long Life*, and to the more Placide motion of the Spirits, which thereby doe lesse prey and consume the Iuyce of the Body; Either that *Mens Actions be free and voluntary*; That nothing be done *Inuitâ Minerâ*, but *Secundum Genium*: Or on the other side, that the *Actions of Men be full of Regulation, and Commands within themselves*: For then the Victory and Performing of the Command, giueth a good Disposition to the Spirits; Especially if there be a Proceeding from Degree to Degree; For then the Sense of Victory is the greater. An example of the former of these, is in a Country life; And of the latter, in *Monkes* and *Philosophers*, and such as doe continually enioyne themselves.

IT is certaine, that in all Bodies, there is an *Appetite of Vnion*, and Euitation of Solution of Continuities: And of this *Appetite* there be many *Degrees*; But the most Remarkable, and fit to be distinguished, are three. The first in *Liquors*; The second in *Hard Bodies*: And the third in *Bodies Cleauing* or *Tenacious*. In *Liquors*, this *Appetite* is weak: We see in *Liquors*, the *Thredding* of them in *Stillicides*, (as hath beene said;) The *Falling* of them in *Round Drops*, (which is the forme of *Vnion*;) And the *Staying* of them, for a little time, in *Bubbles* and *Froth*. In the second *Degree* or *Kinde*, this *Appetite* is strong; As in *Iron*, in *Stone*, in *Wood*, &c. In the third, this *Appetite* is in a *Medium* betweene the other two: For such *Bodies* doe partly follow the Touch of another Bodie; And partly sticke and continue to themselves; And therefore they roape, and draw themselves in Threds; As we see in *Pitch*, *Glew*, *Birdlime*, &c. But note, that all *Solide Bodies* are *Cleauing*, more or lesse: And that they loue better the Touch of somewhat that is *Tangible*, than of *Aire*. For *Water*, in small quantitie, cleaueth to any Thing that is *Solide*; And so would *Metall* too, if the weight drew it not off. And therefore *Gold Foliate*, or any *Metall Foliate*, cleaueth: But those *Bodies* which are noted to be *Clammie*, and *Cleauing*, are such, as haue a more indifferent *Appetite* (at once,) to follow another Bodie; And to hold to them-

Experiment
Solitary touch-
ing the Ori-
ent Colours in
dissolution of
Metalls.

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Experiment
Solitary touch-
ing Prolonga-
tion of Life.

292

Experiment
Solitary touch-
ing Appetite
of Vnion in Bo-
dies.

293

themselves. And therefore they are commonly *Bodies* ill mixed; And which take more pleasure in a *Forraine Body*, than in preserving their owne *Consistence*; And which have little predominance in *Drought*, or *Moisture*.

Experiment
Solitary tou-
ching the like
Operations of
Heat, and Time

294

Time, and Heat, are Fellowes in many Effects. Heat drieth Bodies, that doe easily expire; As Parchment, Leaues, Roots, Clay, &c. And, so doth Time or Age arefie; As in the same Bodies, &c. Heat dissolueth and melteth Bodies, that keepe in their Spirits; As in diuers *Liquefactions*; And so doth Time, in some Bodies of a softer Consistence: As is manifest in Honey, which by Age waxeth more liquid; And the like in Sugar; And so in old Oyle, which is euer more cleare, and more hot in Medicinable vse. Heat causeth the Spirits to search some Issue out of the Body; As in the *Volatility* of *Metalls*; And so doth Time; As in the *Rust* of *Metalls*. But generally Heat doth that in small time, which Age doth in long.

Experiment
Solitary tou-
ching the disse-
ring Operations
of Fire, and
Time.

295

Some things which passe the Fire are softest at first, and by Time grow Shard; As the Crumme of Bread. Some are harder when they come from the Fire, and afterwards giue againe, and grow soft, as the Crust of Bread, Bisket, Sweet Meats, Salt, &c. The Cause is, for that in those things which wax Hard with Time, the Worke of the Fire is a Kinde of *Melting*: And in those that wax Soft with Time, (contrariwise,) the worke of the Fire is a Kinde of *Baking*; And whatsoever the Fire baketh, Time doth in some degree dissolue.

Experiment
Solitary tou-
ching Motions
by Imitation.

296

Motions passe from one Man to another, not so much by Exciting Imagination; as by Inuitation; Especially if there be an Aptnesse or Inclination before. Therefore *Gaping*, or *Yawning*, and *Stretching* doe passe from Man to Man; For that that causeth *Gaping* and *Stretching* is, when the Spirits are a little Heauy, by any Vapour, or the like. For then they strue, (as it were,) to wring out, and expell that which loadeth them. So Men drowzie, and desirous to sleepe; Or before the Fit of an Ague; doe vse to Yawne and Stretch; And doe likewise yeeld a *Voice* or *Sound*, which is an *Interiection* of *Expulsion*: So that if another be apt and prepared to doe the like, he followeth by the Sight of another. So the *Laughing* of another maketh to *Laugh*.

Experiment
Solitary tou-
ching Infectious
Diseases.

297

There be some knowne *Diseases* that are *Infectious*; And Others that are not. Those that are *Infectious*, are; First, such as are chiefly in the *Spirits*, and not so much in the *Humours*; And therefore passe easily from Bodie to Bodie: Such are *Pestilences*, *Lippitudes*, and such like. Secondly, such as Taint the *Breath*; Which wee see passeth manifestly from Man to Man; And not inuisibly, as the *Affects* of the *Spirits* doe: Such are *Consumptions* of the *Lungs*, &c. Thirdly, such as come forth to the *Skinne*; And therefore taint the *Aire*, or the *Body* *Adiacent*;

Adiacent; Especially if they consist in an Vnctuous Substance, not apt to dissipate; Such are *Scabs*, and *Leprousie*. Fourthly, such as are meere-ly in the *Humours*, and not in the *Spirits*, *Breath*, or *Exhalations*: And therefore they neuer infect, but by *Touch* only; And such a *Touch* also, as commeth within the *Epidermis*; As the Venome of the *French Pox*; And the *Biting* of a *Mad Dog*.

Most *Powders* grow more Close and Coherent by *Mixture* of *Water*, than by *Mixture* of *Oyle*, though *Oyle* be the thicker Bodie; As *Meale*; &c. The Reason is the Congruitie of Bodies; which if it be more, maketh a Perfecter Imbibition, and Incorporation; Which in most *Powders* is more betweene *Them* and *Water*, than betweene *them*, and *Oyle*: But *Painters Colours* ground, and *Ashes*, doe better incorporate with *Oyle*.

Much *Motion* and *Exercise* is good for some *Bodies*; And *Sitting*, and *lesse Motion* for Others. If the Bodie be Hot, and Void of Superfluous Moistures, too much *Motion* hurteth: And it is an Errour in *Physitians*, to call too much vpon *Exercise*. Likewise Men ought to beware, that they vse not *Exercise*, and a *Spare Diet* both: But if much *Exercise*, then a *Plentifull Diet*; And if *Sparing Diet*, then little *Exercise*. The *Benefits* that come of *Exercise* are, First, that it sendeth *Nourishment* into the Parts more forcibly. Secondly, that it helpeth to Excerne by *Sweat*, and so maketh the Parts assimilate the more perfectly. Thirdly, that it maketh the *Substance* of the *Body* more *Solide* and *Compact*; And so lesse apt to be Consumed and Depredated by the *Spirits*. The *Euills* that come of *Exercise*, are: First, that it maketh the *Spirits* more Hot and Predatory. Secondly, that it doth absorbe likewise, and attenuate too much the Moisture of the *Body*. Thirdly, that it maketh too great *Concussion*, (especially if it be violent,) of the *Inward Parts*; which delight more in Rest. But generally *Exercise*, if it be much, is no Friend to *Prolongation of Life*; Vvhich is one cause, why *Women* liue longer than *Men*, because they stirre lesse.

Some *Food* we may vse long, and much, without *Glutting*; As Bread, *Flesh* that is not fat, or rancke, &c. Some other, (though pleasant,) *Glutteth* sooner; As Sweet Meats, Fat Meats, &c. The *Cause* is, for that *Appetite* consisteth in the Emptinesse of the Mouth of the *Stomacke*; Or possessing it with somewhat that is Astringent; And therefore Cold and Drie. But things that are *Sweet* and *Fat*, are more Filling: And doe swimme and hang more about the Mouth of the *Stomacke*; And goe not downe so speedily: And againe turne sooner to *Choler*, which is hot, and cuer abateth the Appetite. Vvee see also, that another *Cause* of *Sacietie*, is an *Ouer-custome*; and of *Appetite* is *No-ueltye*: And therefore *Meats*, if the same be continually taken, induce *Loathing*. To giue the Reason of the *Distaste* of *Sacietie*, and of the *Pleasure*

Experiment
Solitary tou-
ching the In-
corporation of
Powders and
Liquors.

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Experiment
Solitary tou-
ching *Exercise*
of the Bodie.

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Experiment
Solitary tou-
ching Meats,
that induce Sa-
cietie.

300

sure in *Noveltie*; and to distinguish not onely in Meats and Drinkes, but also in Motions, Loues, Company, Delights, Studies, what they be that *Custom* maketh more gratefull; And what more tedious; were a large Field. But for *Meats*, the Cause is *Attraction*, which is quicker, and more excited towards that which is new, than towards that whereof there remaineth a Rellish by former vse. And (generally) it is a Rule, that whatsoeuer is somewhat Ingrate at first, is made Gratefull by *Custom*; But whatsoeuer is too Pleasing at first, groweth quickly to *satiase*.

NATV-



NATVRALL HISTORIE.

IV. Century.



ACCELERATION of Time in Works of Nature, may well be esteemed *Inter Magnalia Naturæ*. And euen in *Diuine Miracles*, *Accelerating* of the Time, is next to the *Creating* of the Matter. We will now therefore proceed to the Enquiry of it: And for *Acceleration* of *Germination*, we will referre it ouer, vnto the place, where we shall handle the Subiect of *Plants*, generally; And will now begin with other *Accelerations*.

Liquors are (many of them) at the first, thicke and troubled; As *Must*, *Wort*, *Iuyces* of *Fruits*, or *Herbs* expressed, &c. And by Time they settle and Clarifie. But to make them cleare, before the Time, is a great Worke; For it is a Spurre to Nature, and putteth her out of her pace: And besides, it is of good vse, for making *Drinkes*, and *Sauces*, Potable, and Seruiceable, speedily; But to know the *Meanes* of *Accelerating Clarification*, we must first know the *Causes* of *Clarification*. The first Cause is, by the *Separation* of the *Grosser Parts* of the *Liquor*, from the *Finer*. The second, by the *Equall Distribution* of the *Spirits* of the *Liquor*, with the *Tangible Parts*: For that euer representeth Bodies Cleare and Vntrou-

H

bled,

Experiments
in Consort,
touching the
Clarification of
Liquors, and
the Accelerating
thereof.

301

bled. The third, by the *Refining* the *Spirit* it selfe, which thereby giueth to the *Liquor* more Splendor, and more Lustre.

302 First, for *Separation*; It is wrought by *Weight*; As in the ordinary Residence or Settlement of *Liquors*: By *Heat*: By *Motion*: By *Precipitation*, or *Sublimation*; (That is, a Calling of the seuerall Parts, either vp, or downe, which is a kinde of *Attraction*;) By *Adhesion*; As when a Body more *Viscous* is mingled and agitated with the *Liquor*; which Viscous Body (afterwards seuered) draweth with it the grosser parts of the *Liquor*: And Lastly, By *Percolation* or *Passage*.

303 Secondly, for the *Euen Distribution* of the *Spirits*; It is wrought By *Gentle Heat*; And By *Agitation* or *Motion*; (For of *Time* we speake not, because it is that, wee would anticipate and represent:) And it is wrought also, By *Mixture* of some other *Body*, which hath a vertue to open the *Liquor*, and to make the *Spirits* the better passe thorow.

304 Thirdly, for the *Refining* of the *Spirit*, it is wrought likewise By *Heat*; By *Motion*; And by *Mixture* of some *Body* which hath *Vertue* to attenuate. So therefore (hauing shewne the *Causes*) for the *Accelerating* of *Clarification*, in generall, and the *Enducing* of it; take these *Instances*, and *Trialls*.

305 It is in common Practise, to draw *Wine*, or *Beere*, from the *Lees*, (which we call *Racking*;) whereby it will *Clarifie* much the sooner: For the *Lees*, though they keepe the *Drinke* in Heart, and make it lasting; yet withall they cast vp some Spissitude: And this *Instance* is to be referred to *Separation*.

306 On the other side, it were good to try, what the Adding to the *Liquour* more *Lees* than his owne will worke; For though the *Lees* doe make the *Liquor* turbide, yet they refine the *Spirits*. Take therefore a Vessell of *New Beere*; And take another Vessell of *New Beere*, and Rack the one Vessell from the *Lees*, and powre the *Lees* of the Racked Vessell into the vnacked Vessell, and see the Effect: This *Instance* is referred to the *Refining* of the *Spirits*.

307 Take *New Beere*, and put in some Quantity of *Stale Beere* into it, and see whether it will not accelerate the *Clarification*, by Opening the Body of the *Beere*, and Cutting the Grosser Parts, wherby they may fall downe into *Lees*. And this *Instance* againe is referred to *Separation*.

308 The longer *Malt*, or *Herbs*, or the like, are Infused in *Liquor*, the more thicke and troubled the *Liquor* is; But the longer they be decocted in the *Liquor*, the clearer it is. The Reason is plaine, because in *Infusion*, the longer it is, the greater is the Part of the Grosse Body, that goeth into the *Liquor*: But in *Decoction*, though more goeth forth, yet it either purgeth at the Top, or setleth at the Bottome. And therefore the most Exact Way to *Clarifie* is; First, to *Infuse*, and then to take off the *Liquor* and *Decoct* it; as they doe in *Beere*, which hath *Malt* first Infused in the *Liquor*, and is afterwards boiled with the Hop. This also is referred to *Separation*.

309 Take *Hot Embers*, and put them about a Bottle filled with *New Beere*, almost

almost to the very Neck; Let the Bottle be well stopped, lest it flie out: And continue it, renewing the *Embers* every day, by the space of Ten Daies; and then compare it with another Bottle of the same *Beere* set by. Take also Lime both *Quenched* and *Vnquenched*, and set the Bottles in them, *ut supra*. This *Instance* is referred, both to the *Euen Distribution*, and also to the *Refining* of the *Spirits* by *Heat*.

Take *Bottles*, and *Swing* them; Or *Carry* them in a *Whee*-*Barrow*, vpon *Rough Ground*; twice in a day: But then you may not fill the *Bottles* full, but leaue some *Aire*; For if the *Liquour* come close to the *Stopp*, it cannot play, nor flower: And when you haue shaken them well, either way, powre the *Drinke* into another Bottle, stopped close, after the vsuall manner; For if it stay with much *Aire* in it, the *Drinke* will pall; neither will it settle so perfectly in all the *Parts*. Let it stand some 24. houres: Then take it, and put it againe into a *Bottle* with *Aire*, *ut supra*: And thence into a *Bottle Stopped*, *ut supra*: And so repeat the same *Operation* for seuen daies. Note that in the *Emptying* of one *Bottle* into another, you must doe it swiftly, lest the *Drinke* pall. It were good also, to try it in a *Bottle* with a little *Aire* below the *Necke*, without *Emptying*. This *Instance* is referred to the *Euen Distribution* and *Refining* of the *Spirits* by *Motion*.

As for *Percolation*, *Inward* and *Outward*, (which belongeth to *Separation*.) Triall would be made, of *Clarifying* by *Adhesion*, with *Milke* put into *New Beere*, and stirred with it: For it may be that the *Grosser Part* of the *Beere* will cleaue to the *Milke*: The Doubt is, whether the *Milke* will seuer well againe; Which is soone tried. And it is vsuall in *Clarifying Ippocrasse* to put in *Milke*; Which after seuereth and carrieth with it the *Grosser Parts* of the *Ippocrasse*, as hath beene said elsewhere. Also for the better *Clarification* by *Percolation*, when they run *New Beere*, they vse to let it passe thorow a *Strainer*; And it is like, the finer the *Strainer* is, the cleerer it will be.

The *Accelerating* of *Maturation* wee will now enquire of. And of *Maturation* it selfe. It is of three *Natures*. The *Maturation* of *Fruits*: The *Maturation* of *Drinks*: And the *Maturation* of *Impostumes* and *Vlcers*. This last we referre to another Place, where wee shall handle *Experiments Medicinall*. There be also other *Maturations*, as of *Metals*, &c. whereof we will speake as *Occasion* serueth. But we will begin with that of *Drinkes*, because it hath such *Affinity* with the *Clarification* of *Liquors*.

For the *Maturation* of *Drinks*, it is wrought by the *Congregation* of the *Spirits* together, whereby they digest more perfectly the *Grosser Parts*: And it is effected partly, by the same meanes, that *Clarification* is (whereof we spake before;) But then note, that an *Extreme Clarification* doth

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Experiments
in Consort
touching *Ma-
turation*, and
the *Accelerating*
thereof. And
first touching
the *Maturation*
and *Quickning*
of *Drinks*. And
next touching
the *Maturation*
of *Fruits*.

312

spread the *Spirits* so Smooth, as they become Dull, and the *Drinke* dead, which ought to haue a little Flouring. And therefore all your Cleare *Amber Drinke* is flat.

313

We see the *Degrees of Maturation of Drinkes*; In *Must*; In *Wine*, as it is drunke; And in *Vinegar*. Whereof *Must* hath not the *Spirits* well Congregated; *Wine* hath them well vnited; so as they make the Parts somewhat more Oylie: *Vinegar* hath them Congregated, but more Ieiune, and in smaller Quantity; The greatest and finest Spirit and Part being exhaled: For we see *Vinegar* is made by setting the Vessel of *Wine* against the hot Sun: And therefore *Vinegar* will not burne; For that much of the Finer Parts is Exhaled.

314

The *Refreshing* and *Quickning* of *Drinke* Palled, or Dead, is by *Enforcing* the *Motion* of the *Spirit*: So we see that *Open Weather* relaxeth the *Spirit*, and maketh it more liuely in *Motion*. Wee see also *Bottelling* of *Beere*, or *Ale*, while it is New, and full of *Spirit* (so that it spirteth when the Stopple is taken forth) maketh the *Drinke* more quicke and windy. A *Pan* of *Coales* in the *Cellar* doth likewise good, and maketh the *Drinke* worke againe. *New Drinke*, put to *Drinke* that is *Dead*, prouoketh it to worke againe: Nay, which is more (as some affirme) *A Brewing of New Beere*, set by *Old Beere*, maketh it worke againe. It were good also to *Enforce* the *Spirits* by some *Mixtures*, that may excite and quicken them; As by Putting into the *Bottles*, *Nitre*, *Chalke*, *Lime*, &c. We see *Creame* is *Matured*, and made to rise more speedily, by Putting in *Cold Water*; which, as it seemeth, getteth downe the *Whey*.

315

It is tried, that the *Burying* of *Bottles of Drinke* well stopped, either in *dry Earth*, a good depth; Or in the *Bottom* of a *Well* within *Water*; And best of all the *Hanging* of them in a *deepe Well* somewhat *aboue the Water*, for some fortnights space, is an Excellent *Meanes* of making *Drinke* fresh, and quicke: for the *Cold* doth not cause any *Exhaling* of the *Spirits* at all; As *Heat* doth, though it rarifieth the rest that remaine: But *Cold* maketh the *Spirits* vigorous, and irritateth them, whereby they Incorporate the Parts of the *Liquor* perfectly.

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As for the *Maturation of Fruits*; It is wrought by the *Calling forth* of the *Spirits of the Body outward*, and so *Spreading* them more *smoothly*: And likewise by *Digesting*, in some degree, the *Grosser Parts*: And this is Effected, by *Heat*; *Motion*; *Attraction*; And by a *Rudiment* of *Putrefaction*: For the *Inception* of *Putrefaction* hath in it a *Maturation*.

317

There were taken *Apples*, and laid in *Straw*; In *Hay*; In *Flower*; In *Chalke*; In *Lime*; Couered ouer with *Onions*; Couered ouer with *Crabs*; Closed vp in *Wax*; Shut in a *Box*, &c. There was also an *Apple* hanged vp in *Smoake*: Of all which the *Experiments* sorted in this Manner.

318

After a Moneths Space, the *Apple* Enclosed in *Wax*, was as Greene and Fresh as at the first Putting in, & the *Kernels* continued White. The *Cause* is, for that all *Exclusion* of *Open Aire* (which is euer Predatory) maintaineth the Body in his first Freshnesse, and Moisture: But the Inconuenience

conuenience is, that it tasteth a little of the *Wax*: Which I suppose, in a *Pomgranate*, or some such thick-coated *Fruit*, it would not doe.

The *Apple* Hanged in the *Smoake*, turned like an Old Mellow *Apple*, Wrinkled, Dry, Soft, Sweet, Yellow within. The *Cause* is, for that such a degree of *Heat*, which doth neither Melt, nor Scorch, (For we see that in a great *Heat*, a *Roast Apple* Softneth and Melteth; And *Pigs-feet*, made of Quarters of *Wardens*, scorch and haue a Skin of Cole) doth Mellow, and not Adure: The *Smoake* also maketh the *Apple* (as it were) sprinkled with *Soot*, which helpeth to *Mature*. We see that in *Drying* of *Peares*, and *Prunes*, in the *Ouen*, and Remouing of them often as they begin to Sweat, there is a like Operation; But that is with a farre more Intense degree of *Heat*.

The *Apples* couered in the *Lime* and *Ashes*, were well *Matured*; As appeared both in their Yellownesse and Sweetnesse. The *Cause* is, for that that Degree of *Heat* which is in *Lime*, and *Ashes* (being a Smothering *Heat*) is of all the rest most Proper; for it doth neither Liquefie, nor Arefie; And that is true *Maturation*. Note that the Taste of those *Apples* was good; And therefore it is the *Experiment* fittest for Vse.

The *Apples*, Couered with *Crabs*, and *Onions*, were likewise well *Matured*. The *Cause* is, not any *Heat*; But for that the *Crabs* and the *Onions* draw forth the *Spirits* of the *Apple*, and spread them equally thorowout the *Body*; which taketh away Hardnesse. So we see one *Apple* ripeneth against another. And therefore in making of *Cider*, they turne the *Apples* first vpon a heape. So one *Cluster* of *Grapes*, that toucheth another whilest it groweth, ripeneth faster; *Botrus contra Botrum citius maturescit*.

The *Apples* in *Hay*, and the *Straw*, ripened apparantly, though not so much as the Other; But the *Apple* in the *Straw* more. The *Cause* is, for that the *Hay* and *Straw* haue a very low degree of *Heat*, but yet Close and Smothering, and which drieth not.

The *Apple* in the *Close Box*, was ripened also: The *Cause* is, for that all Aire, kept close, hath a degree of *Warmth*: As we see in *Wooll*, *Furre*, *Plush*, &c.

Note that all these were Compared with another *Apple*, of the same kinde, that lay of it Selfe: And in Comparison of that, were more Sweet, and more Yellow, and so appeared to be more Ripe.

Take an *Apple*, or *Peare*, or other like *Fruit*, and Rowle it vpon a Table hard: We see in Common Experience, that the *Rowling* doth Soften and Sweeten the *Fruit* presently; Which is Nothing but the *Smooth Distribution* of the *Spirits* into the Parts: For the *Vnequall Distribution* of the *Spirits* maketh the *Harrishnesse*: But this Hard *Rowling* is betweene *Concoction*, and a *Simple Maturation*; Therefore, if you should Rowle them but gently, perhaps twice a day; And continue it some seuen daies, it is like they would *mature* more finely, and like vnto the *Naturall Maturation*.

Take an *Apple*, and cut out a Preece of the Top, and couer it, to see whether that *Solution of Continuity* will not hasten a *Maturation*: We see that

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that where a *Waspe*, or a *Flie*, or a *Worme* hath bitten, in a *Grape* or any *Fruit*, it will sweeten hastily.

Take an *Apple*, &c. and pricke it with a *Pinne* full of *Holes*, not deepe, and smeare it a little with *Sacke*, or *Cinnamon Water*, or *Spirit of Wine*, euery day for ten daies, to see if the *Virtuall Heat* of the *Wine*, or *Strong Waters*, will not *Mature* it.

In these *Trialls* also, as was used in the first, set another of the same *Fruits*, by, to Compare them: And try them, by their *Yellownesse*, and by their *Sweetnesse*.

Experiment
Solitary tou-
ching the Ma-
king of Gold.

The *World* hath beene much abused by the *Opinion* of *Making of Gold*: The *Worke* it selfe I iudge to be possible; But the *Meanes* (hitherto propounded) to effect it, are, in the *Practise*, full of *Errour* and *Imposture*; And in the *Theory*, full of vnfound *Imaginations*. For to say, that *Nature* hath an *Intention* to make all *Metals Gold*; And that, if she were deliuered from *Impediments*, shee would performe her owne *Worke*; And that, if the *Crudities*, *Impurities*, and *Leprosities* of *Metals* were cured, they would become *Gold*; And that a little *Quantity* of the *Medicine*, in the *Worke* of *Proiection*, will turne a *Sea* of the *Baser Metall* into *Gold*, by *Multipling*. All these are but *dreames*: And so are many other *Grounds* of *Alchymy*. And to helpe the *Matter*, the *Alchymists* call in likewise many *Vanities*, out of *Astrologie*; *Naturall Magicke*; *Superstitious Interpretations* of *Scriptures*; *Auricular Traditions*; *Faigned Testimonies* of *Ancient Authors*; And the like. It is true, on the other side, they haue brought to light not a few profitable *Experiments*, and thereby made the *World* some amends. But we, when we shall come to handle the *Version* and *Transmutation* of *Bodies*; And the *Experiments* concerning *Metalls*, and *Mineralls*; will lay open the true *Waies* and *Passages* of *Nature*, which may leade to this great *Effect*. And we commend the wit of the *Chineses*, who despaire of *Making of Gold*, but are Mad vpon the *Making of Siluer*: For certaine it is, that it is more difficult to make *Gold*, (which is the most *Pondrous*, and *Materiate* amongst *Metals*) of other *Metals*, lesse *Ponderous*, and lesse *Materiate*; than (*via versa*) to make *Siluer* of *Lead*, or *Quick-Siluer*; Both which are more *Ponderous* than *Siluer*; So that they need

ned rather a further Degree of *Fixation*, than any *Condensation*. In the meane time, by Occasion of Handling the *Axiomes* touching *Maturation*, we will direct a *Triall* touching the *Maturing* of *Metalls*, and thereby Turning some of them into *Gold*: For we conceiue indeed, that a perfect good *Concoction*, or *Disgestion*, or *Maturation* of some *Metalls*, will produce *Gold*. And here we call to minde, that we knew a *Dutch-man*, that had wrought himselfe into the beleefe of a great Person, by vndertaking that hee could make *Gold*: whose discourse was, that *Gold* might be made; But that the *Alchymists* Quer-fired the Worke: For (he said) the *Making* of *Gold* did require a very temperate *Heat*, as being in *Nature* a Subterrany work, where little *Heat* commeth; But yet more to the *Making* of *Gold*, than of any other *Metall*; And therefore that he would doe it with a great Lampe, that should carry a Temperate and Equall *Heat*: And that it was the Worke of many Moneths. The Deuice of the Lampe was folly; But the Ouer-firing now vsed; And the Equall *Heat* to be required; And the *Making* it a Worke of some good Time; are no ill Discourses.

Wee resort therefore to our *Axiomes* of *Maturation*, in Effect touched before. The first is, that there be used a *Temperate Heat*; For they are euer *Temperate Heats* that *Disgest*, and *Mature*: Wherein we meane *Temperate*, according to the *Nature* of the *Subiect*; For that may be *Temperate* to *Fruits*, and *Liquors*, which will not worke at all vpon *Metalls*. The Second is, that the *Spirits* of the *Metall* be quickened, and the *Tangible Parts* opened: For without those two Operations, the *Spirit* of the *Metall*, wrought vpon, will not be able to disgest the *Parts*. The Third is, that the *Spirits* doe spread themselves *Euen*, and move not *Subsultorily*; For that will make the *Parts* Close, and Pliant. And this requireth a *Heat*, that doth not rise and fall, but continue as *Equall* as may be. The Fourth is, that no *Part* of the *Spirit* be emitted, but detained: For if there be *Emission* of *Spirit*, the *Bodie* of the *Metall* will be Hard, and Churlish. And this will be performed, partly by the Temper of the *Fire*; And partly by the closenesse of the *Vessell*. The Fifth

Fifth is, that there be *Choyce made of the likeliest and best Prepared Metall, for the Version*: For that will facilitate the Worke. The Sixth is, that you giue *Time enough for the Worke*: Not to prolong Hopes (as the Alchymists doe;) but indeed to giue *Nature* a conuenient Space to worke in. These Principles are most certaine, and true; Wee will now deriue a direction of *Triall* out of them; Which may (perhaps) by further Meditation, be improued.

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Let there be a *Small Furnace* made, of a *Temperate Heat*; Let the *Heat* bee such, as may keepe the *Metall perpetually Moulten*, and no more; For that aboue all importeth to the Worke. For the *Materiall*, take *Siluer*, which is the *Metall* that in *Nature* Symbolizeth most with *Gold*; Put in also, with the *Siluer*, a Tenth Part of *Quick-siluer*, and a Twelfth Part of *Nitre*, by weight; Both these to quicken and open the Body of the *Metall*: And so let the Worke be continued by the *Space of Six Moneths*, at the least. I wish also, that there be, at some times, an Iniection of some *Oyled Substance*; Such as they vse in the Recouering of *Gold*: which by Vexing with Separations hath beene made Churlish: And this is, to lay the Parts more Close and Smooth, which is the *Maine Worke*. For *Gold* (as we see) is the Closest (and therefore the Heauiest) of *Metalls*: And is likewise the most Flexible, and Tensible. Note, that to thinke to make *Gold* of *Quick-siluer*, Because it is the heaviest, is a Thing not to be hoped; For *Quick-siluer* will not endure the Mannage of the *Fire*. Next to *Siluer*, I thinke *Copper* were fittest to be the *Materiall*.

Experiment
Solitary touching the
Nature of Gold.

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Gold hath these *Natures*: *Greatnesse of Weight*; *Closenesse of Parts*; *Fixation*; *Pliantnesse*, or *Softnesse*; *Immunity from Rust*; *Colour* or *Tincture of Yellow*. Therefore the *Sure Way*, (though most about,) to make *Gold*, is to know the *Causes* of the *Seuerall Natures* before rehearsed, and the *Axiomes* concerning the same. For if a Man can make a *Metall*, that hath all these *Properties*, Let Men dispute, whether it be *Gold*, or no?

Experiments
in Consort,
touching the
Enducing and
Accelerating of
Putrefaction.

The *Enducing* and *Accelerating* of *Putrefaction*, is a Subiect of a very Vniuersall Enquiry: For *Corruption* is a Reciprocall to *Generation*: And they Two, are as *Natures* two *Termes* or *Bundaries*; And the *Guides* to *Life* and *Death*. *Putrefaction* is the *Worke* of the *Spirits* of *Bodies*, which euer are Vnquiet to *Get forth*, and *Congregate* with the *Aire*, and to enioy the *Sun-beames*. The *Getting forth*, or *Spreading* of the *Spirits*, (which is a Degree of *Getting forth*,) hath five Differing *Operations*. If the

the *Spirits* be detained within the Body, and moue more violently, there followeth *Colliquation*; As in *Metalls*, &c. If more Mildely, there followeth *Digestion*, or *Maturation*; As in *Drinkes*, and *Fruits*. If the *Spirits* be not meereley Detained, but Protrude a little, and that Motion be Confused, and Inordinate, there followeth *Putrefaction*; Which euer dissolueth the Consistence of the Body into much Inequality; As in *Flesh*, *Rotten Fruits*, *Shining Wood*, &c. And also in the *Rust* of *Metalls*. But if that Motion be in a certaine Order, there followeth *Viuiification*, and *Figuration*; As both in *Living Creatures* bred of *Putrefaction*, and in *Living Creatures Perfect*. But if the *Spirits* issue out of the Body, there followeth *Desiccation*, *Induration*, *Consumption*, &c. As in *Bricke*, *Evaporation* of *Bodies Liquid*, &c.

The *Meanes* to *Enduce* and *Accelerate Putrefaction*, are; First by *Adding some Crude or Watry Moisture*; As in *Wetting* of any *Flesh*, *Fruit*, *Wood*, with *Water*, &c. For contrariwise *Vacuous* and *Oily Substances* preserve.

The Second is by *Invitation or Excitation*; As when a *Rotten Apple* lyeth close to another *Apple* that is *Sound*: Or when *Dung* (which is a Substance already *Putrified*) is added to other *Bodies*. And this is also notably seene in *Church yards*, where they bury much; Where the *Earth* will consume the *Corps*, in farre shorter time, than other *Earth* will.

The Third is, by *Clofenesse*, and *Stopping*, which detaineth the *Spirits*, in *Prison*, more than they would; And thereby irritateth them to seeke *Issue*; As in *Corne*, and *Cloaths*, which wax *Musty*; and therefore *Open Aire* (which they call *Aer perflabilis*) doth preserve: and this doth appeare more Evidently in *Agnes*, which come (most of them,) of *Obstructions*, and *Penning* the *Humours*, which thereupon *Putrifie*.

The Fourth is, by *Solution of Continuitie*; As we see an *Apple* will rot sooner, if it be *Cut* or *Pierced*; And so will *Wood*, &c. And so the *Flesh* of *Creatures* aliue, where they haue receiued any *Wound*.

The Fifth is, either by the *Exhaling*, or by the *Drining back* of the *Principall Spirits*, which preserve the Consistence of the *Body*; So that when their *Gouernment* is *Dissolued*, euery *Part* returneth to his *Nature*, or *Homogeny*. And this appeareth in *Vrine*, and *Bloud*, when they coole, and thereby breake; It appeareth also in the *Gangrene*, or *Mortification* of *Flesh*, either by *Opiates*, or by *Intense Colds*. I conceiue also the same Effect is in *Pestilences*, for that the *Malignitie* of the *Infecting Vapour*, daunceth the *Principall Spirits*, and maketh them fly, and leaue their *Regiment*; And then the *Humours*, *Flesh*, and *Secondary Spirits*, doe dissolue, and breake, as in an *Anarchy*.

The

334 The Sixth is, when a *Forraine Spirit*, Stronger and more Eager than the *Spirit of the Body*, entreth the Body; As in the Stinging of Serpents. And this is the Cause (generally) that vpon all *Poysons* followeth *Swelling*: And we see *Swelling* followeth also, when the *Spirits* of the Body it selfe, Congregate too much; As vpon *Blowes*, and *Bruises*; Or when they are *Pent in too much*, as in *Swelling* vpon *Cold*. And we see also, that the *Spirits* comming of *Putrefaction* of *Humours* in *Agues*, &c. which may be counted as *Forraine Spirits*, though they be bred within the Body, doe Extinguish and Suffocate the *Naturall Spirits*, and *Heat*.

335 The Seuenth is, by such a *Weake Degree of Heat*, as setteth the *Spirits* in a little Motion, but is not able, either to digest the Parts, or to Issue the *Spirits*; As is seene in *Flesh* kept in a Roome that is not Coole: Whereas in a Coole and Wet Larder it will keepe longer. And we see, that *Vinification* (whereof *Putrefaction* is the *Bastard Brother*,) is effected by such Soft Heats; As the Hatching of Egges; The Heat of the Wombe, &c.

336 The Eight is, by the *Releasing of the Spirits*; which before were close kept by the Solidnesse of their Couerture, and thereby their Appetite of Issuing checked; As in the *Artificiall Rusts* induced by strong Waters, in *Iron*, *Lead*, &c. And therefore *Wetting* hasteneth *Rust*, or *Putrefaction* of any thing, because it softeneth the Crust, for the *Spirits* to come forth.

337 The Ninth is, by the *Enterchange of Heat and Cold*, or *Wet and drie*; As wee see in the Mouldring of Earth in Frosts, and Sunne; And in the more hastie Rotting of Wood, that is sometimes wet, sometimes drie.

338 The tenth is, by *Time*, and the *Worke and Procedure of the Spirits themselves*, which cannot keepe their Station; Especially if they be left to themselves; And there be not Agitation or Locall Motion. As we see in *Corne* not stirred; And mens Bodies not exercised.

339 All *Moulds* are Inceptions of *Putrefaction*; As the *Moulds* of *Pyes*, and *Flesh*; the *Moulds* of *Orenge*s, and *Limons*; which *Moulds* afterwards turne into *Wormes*, or more odious *Putrefactions*: And therefore (commonly) proue to be of ill Odour. And if the Body be Liquid, and not apt to Putrifie totally, it will cast vp a *Mother* in the Top; As the *Mothers* of *Distilled Waters*.

340 *Mosse* is a Kinde of *Mould*, of the Earth, and Trees. But it may be better sorted as a *Rudiment of Germination*; To which we referre it.

Experiments
in Consort tou-
ching Prohibi-
ting and Preuen-
ting *Putrefaction*.

It is an Enquiry of Excellent vse, to Enquire of the *Meanes of Preuenting or Staying Putrefaction*; For therein consisteth the *Meanes of Conseruation of Bodies*; For *Bodies* haue two Kindes of *Dissolutions*; The one by *Consumption*, and *Desiccation*; The other by *Putrefaction*. But as for the *Putrefactions* of

of the *Bodies* of Men, and *Living Creatures*, (as in Agues, Wormes, Consumptions of the Lungs, Impostumes, and Ulcers both Inwards and Outwards,) they are a great *Part* of *Physicke*, and *Surgery*: And therefore we will reserve the *Enquiry* of them to the proper Place, where we shall handle *Medicinall Experiments* of all Sorts. Of the rest we will now Enter into an *Enquiry*: wherein much light may be taken, from that which hath beene said, of the *Meanes* to *Enduce* or *Accelerate Putrefaction*: For the Remouing that, which caused *Putrefaction*, doth *Preuent* and *Avoid Putrefaction*.

The First *Meanes* of *Prohibiting* or *Checking Putrefaction*, is *Cold*: For so we see that Meat and Drinke will last longer, Vnputrified, or Vnsoured, in Winter, than in Summer: And we see that Flowers, and Fruits, put in *Conseruatories* of Snow, keepe fresh. And this worketh by the *Detention* of the *Spirits*, and *Constipation* of the *Tangible Parts*.

The second is *Astriction*: For *Astriction* prohibiteth *Dissolution*: As we see (generally) in *Medicines*, whereof such as are *Astringents* doe inhibit *Putrefaction*: And by the same reason of *Astringencie*, some small Quantitie of Oile of Vitrioll, will keepe Fresh Water long from *Putrefying*. And this *Astriction* is in a Substance that hath a *Virtuall Cold*; And it worketh (partly) by the same *Meanes* that Cold doth.

The Third is, the *Excluding* of the *Aire*; And againe, the *Exposing* to the *Aire*: For these Contraries, (as it commeth often to passe,) worke the same Effect, according to the Nature of the Subiect Matter. So we see, that *Beere*, or *Wine*, in Bottles close stopped, last long; That the *Garners* under Ground keepe Corne longer than those aboue Ground; And that *Fruit* closed in *Wax* keepeth fresh: And likewise *Bodies* put in *Honey*, and *Flower*, keepe more fresh: And *Liquors*, *Drinkes*, and *Iuyces*, with a little Oyle cast on the Top, keepe fresh. Contrariwise, we see that *Cloth* and *Apparell*, not *Aired*, doe breed Moathes, and Mould; and the Diuersitie is, that in *Bodies* that need *Detention* of *Spirits*, the *Exclusion* of the *Aire* doth good; As in *Drinks*, and *Corne*: But in *Bodies* that need *Emission* of *Spirits*, to discharge some of the Superfluous Moisture, it doth hurt, for they require *Airing*.

The Fourth is *Motion*, and *Stirring*; For *Putrefaction* askest *Rest*; For the Subtill *Motion*, which *Putrefaction* requireth, is disturbed by any *Agitation*; And all *Locall Motion* keepeth *Bodies* Integrall, and their Parts together; As we see that Turning ouer of Corne in a Garner; Or Letting it runne like an Houre-glasse, from an vpper Roome into a Lower, doth keepe it Sweet: And Running Waters putrefie not: And in Mens *Bodies*, Exercise hindereth *Putrefaction*; And contrariwise *Rest*, and Want of *Motion*, or Stoppings, (whereby the Runne of Humours, or the Motion of Perspiration, is stayed,) further *Putrefaction*; As we partly touched a little before.

The

- 345 The Fifth is, the *Breathing forth of the Aduentitious Moisture in Bodies*; For as *Wetting* doth hasten *Putrefaction*; So *Conuenient Drying*, (whereby the more *Radical Moisture* is onely kept in,) putteth backe *Putrefaction*: So we see that *Herbs*, and *Flowers*, if they be dried in the *Shade*; Or dried in the hot *Sunne*, for a small time, keepe best. For the *Emission* of the *Loose* and *Aduentitious Moisture*, doth betray the *Radical Moisture*; And carryeth it out for Company.
- 346 The Sixth is, the *Strengthening of the Spirits of Bodies*; For as a *Great Heat* keepeth Bodies from *Putrefaction*; But a *Tepide Heat* enclineth them to *Putrefaction*: So a *Strong Spirit* likewise preferueth, and a *Weake* or *Faint Spirit* disposeth to *Corruption*. So we finde that *Salt-water* corrupteth not so soone as *Fresh*: And *Salting* of *Oysters*, and *Powdring* of *Meat*, keepeth them from *Putrefaction*. It would be tried also, whether *Chalke* put into *Water*, or *Drinke*, doth not preferue it from *Putrefying*, or speedy *Souring*. So we see that *Strong Beere* will last longer than *Small*; And all Things, that are hot and *Aromaticall*, doe helpe to preferue *Liquors*, or *Powders*, &c. Which they do; as well by *Strengthening the Spirits*, as by *Soaking* out the loose *Moisture*.
- 347 The Seuenth is, *Separation of the Cruder Parts*, and thereby making the *Body more Equall*; for all vnperfect Mixture is apt to *Putrefie*; And *Watry Substances* are more apt to *Putrefie*, than *Oily*. So we see *Distilled Waters* will last longer than *Raw waters*; And things that haue passed the *Fire*, doe last longer, than those that haue not passed the *Fire*; As *Dried Peares*, &c.
- 348 The Eighth is, the *Drawing forth continually of that part, where the Putrefaction beginneth*: Which is (commonly) the *Loose and watry Moisture*; Not onely for the Reason before giuen, that it prouoketh the *Radical Moisture* to come forth with it; But because being detained in the *Body*, the *Putrefaction* taking hold of it, infecteth the rest: As wee see in the *Embalming dead Bodies*: And the same Reason is of *Preseruing Herbs*, or *Fruits*, or *Flowers*, in *Branne*, or *Meale*.
- 349 The Ninth is, the *Commixture of any Thing that is more Oily, or Sweet*: For such *Bodies* are least apt to *Putrefie*, the *Aire* working little vpon them; And they not putrefying preferue the rest. And therefore we see *Syrapps*, and *Ointments*, will last longer, than *Iuyces*.
- 350 The Tenth is, the *Commixture of somewhat that is Drie*; For *Putrefaction* beginneth first from the *Spirits*; And then from the *Moisture*: And that that is drie is vnapt to putrefie: And therefore *Smoake* preferueth *Flesh*; As wee see in *Bacon*, and *Neats-Tongues*, and *Martlemas Beete*, &c.
- 351 The Opinion of some of the *Ancients*, that *Blowne Aires* doe preferue *Bodies*, longer than other *Aires*, seemeth to Mee Probable; For that the *Blowne Aires*, being *Ouer-charged* and *Compressed*, will hardly receiue the *Exhaling* of any Thing, but rather repulse it. It was tried in a *Blowne Bladder*, whereinto *Flesh* was put, and likewise a *Flower*, and it sorted not: For *Dry Bladders* will not *Blow*: And *New Bladders* rather

ther further *Putrefaction*: The way were therefore, to blow strongly, with a Paire of Bellowes, into a Hoghead, putting into the Hoghead (before) that which you would haue preserued; And in the instant that you withdraw the Bellowes, stop the Hole close.

THe Experiment of Wood that *Shineth* in the *Darke*, we haue diligently driuen, and pursued: The rather, for that of all Things, that giue Light here below, it is the most Durable; And hath least Apparent Motion. *Fire* and *Flame* are in continuall Expence; *Sugar* shineth onely while it is in Scraping; And *Salt-water* while it is in Dashing; *Glow-wormes* haue their Shining while they liue, or a little after. Onely *Scales of Fishes* (Putrified) seeme to be of the same Nature with *Shining Wood*: And it is true, that all *Putrefaction* hath with it an Inward Motion, as well as *Fire*, or *Light*. The *Triall* sorted thus. 1. The *Shining* is in some Peeces more *Bright*, in some more *Dimme*; but the most *Bright* of all doth not attaine to the Light of a *Glow-worme*. 2. The *Woods* that haue beene tried to shine, are chiefly *Sallow* and *Willow*; Also the *Asb*, and *Hasse*; It may be, it holdeth in others. 3. Both *Roots*, and *Bodies* doe shine, but the *Roots* better. 4. The *Colour* of the *Shining Part*, by Day-light, is in some Peeces *White*, in some Peeces inclining to *Red*; Which in the Countrey they call the *White*, and *Red Garret*. 5. The *Part* that *Shineth*, is, (for the most part) somewhat *Soft*, and *Moist* to feele to; But some was found to be *Firme* and *Hard*; So as it might be figured into a *Crosse*, or into *Beads*, &c. But you must not looke to haue an *Image*, or the like, in any thing that is *Lightsome*; For euen a face in *Iron red Hot* will not be seene, the *Light* confounding the small differences of *Lightsome* and *Darksome*, which shew the figure. 6. There was the *Shining Part* pared off, till you came to that, that did not Shine; But within two *Daies* the *Part Contiguous* beganne also to *Shine*, being laid abroad in the *Dew*; So as it seemeth the *Putrefaction* spreadeth. 7. There was other dead *Wood* of like kinde, that was *Laid abroad*, which *Shined* not at the first; But after a *Nights* lying abroad began to *Shine*. 8. There was other *Wood*, that did *First shine*; And being laid dry in the *House*, within fve or six daies, *Lost* the *Shining*; And laid abroad againe, *Recovered* the *Shining*. 9. *Shining woods*, being laid in a *Dry Roome*, within a *Seuen night*, lost their *Shining*; but being laid in a *Cellar*, or *Danke Roome*, kept the *Shining*. 10. The *Bearing of Holes*, in that kinde of *Wood*, and then laying it abroad, seemeth to conduce to make it *Shine*: The *Cause* is, for that all *Solution of Continuity* doth helpe on *Putrefaction*, as was touched before. 11. No *Wood* hath beene yet tried to *Shine*, that was cut *downe alive*, but such as was *Rotted*, both in *Stocke*, and *Root*, while it grew. 12. *Part* of the *Wood* that *Shined*, was *steeped in Oile*, and retained the *Shining* a *Forthnight*. 13. The like succeeded in some *Steeped in Water*, and much better. 14. How long the *Shining* will contine, if the *Wood* be *laid abroad euery Night*, and *taken in* and *Sprinkled with Water* in the *Day*, is not yet tried. 15. *Triall* was

Experiment
Solitary tou-
ching Wood
Shining in the
Darke.

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ching Wood
Shining in the
Darke.

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made of *laying it abroad in Frosty weather*, which hurt it not; 16. There was a great *Peece* of a *Root* which did shine, and the *Shining Part* was *Cut off*, till no more Shined; Yet after two Nights, though it were kept in a dry Roome, it got a *Shining*.

Experiment
Solitary tou-
ching the *Acce-*
leration of Birth.

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THe *Bringing forth of Living Creatures* may be *accelerated* in two *Respects*: The one, if the *Embryon ripeneth* and perfecteth sooner: The other if there be some *Cause* from the *Mothers Body*, of *Expulsion* or *Putting it down*: whereof the *Former* is good, and argueth *Strength*; The *Latter* is ill, and commeth by *Accident* or *Disease*. And therefore the *Ancient Observation* is true, that the *Childe borne in the seventh Moneth*, doth commonly well; But *Borne in the Eighth Moneth*, doth (for the most part) die. But the *Cause* assigned is *Fabulous*; Which is, that in the *Eighth Moneth*, should be the *Returne of the Reigne*, of the *Planet Saturne*: which (as they say) is a *Planet Maligne*; whereas in the *Seuenth* is the *Reigne of the Moone*, which is a *Planet Propitious*. But the true *Cause* is, for that where there is so great a *Preuention* of the *Ordinary time*, it is the *lustinesse* of the *Childe*; But when it is lesse, it is some *Indisposition* of the *Mother*.

Experiment
Solitary tou-
ching the *Acce-*
leration of
growth and
Statue.

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TO *Accelerate Growth or Stature*, it must proceed; Either from the *Plenty* of the *Nourishment*; Or from the *Nature* of the *Nourishment*; Or from the *Quickning* and *Exciting* of the *Naturall Heat*. For the first, *Excesse of Nourishment* is hurtfull; For it maketh the *Childe Corpulent*; And *Growing in Breadth*, rather than in *Heighth*. And you may take an *Experiment* from *Plants*, which, if they spread much, are seldome tall. As for the *Nature of the Nourishment*; First, it may not be too *Dry*; And therefore *Children in Dayrie Countries* doe wax more tall, than where they feed more vpon *Bread*, and *Flesh*. There is also a received *Tale*; That *Boyling of Dasse Roots in Milke* (which it is certaine are great *Driers*) will make *Dogs* little. But so much is true, that an *Ouer-drie Nourishment* in *Childhood* putteth backe *Stature*. Secondly, the *Nourishment* must be of an *Opening Nature*; For that *Attenuateth* the *Iuice*, and furthereth the *Motion* of the *Spirits*, vpwards. Neither is it without cause, that *Xenophon*, in the *Nouriture* of the *Persian Children*, doth so much commend their *Feeding vpon Cardamon*; which (hee saith) made them grow better, and be of a more *Active Habit*. *Cardamon* is in *Latine Nasturtium*; And with vs *Water-Cresses*; Which, it is certaine, is an *Herbe*, that whilest it is young, is *Friendly to Life*. As for the *Quickning of Naturall Heat*, it must be done chiefly with *Exercise*; And therefore (no doubt) much *Going to Schoole*, where they sit so much, hindreth the *Growth of Children*; whereas *Country People*, that goe not to *Schoole*, are commonly of better *Stature*. And againe *Men* must beware, how they giue *Children*, any thing that is *Cold* in *Operation*; For euen *Long Sucking* doth hinder both *Wit*, and *Stature*. This hath beene tried, that a *Whelp*, that hath beene fed with *Nitre* in *Milke*, hath become

come very little, but extreme lively: For the *Spirit of Nitre* is Cold. And though it be an Excellent Medicine, in Strength of yeeres, for Prolongation of Life; yet it is, in Children and young Creatures, an Enemy to *Growth*: And all for the same Reason; For *Heat* is requisite to Growth: But after a Man is come to his Middle Age, *Heat* consumeth the Spirits; which the Coldnesse of the Spirit of *Nitre* doth helpe to condense, and correct.

There be two Great Families of Things; You may terme them by severall Names; *Sulphureous* and *Mercuriall*, which are the *Chymists* Words: (For as for their *Sal*, which is their third Principle, it is a Compound of the other two;) *Inflammable* and *Not Inflammable*; *Mature* and *Crude*; *Oily* and *Watry*. For we see that in *Subterraneities* there are, as the *Fathers* of their Tribes, *Brimstone* and *Mercury*: In *Vegetables*, and *Living Creatures*, there is *Water* and *Oile*: In the *Inferiour Order* of *Pneumatics* there is *Aire* and *Flame*: And in the *Superiour*, there is the *Body* of the *Starre*, and the *Pure Sky*. And these Paires, though they be unlike in the Primitive Differences of Matter, yet they seeme to have many Consents: For *Mercury* and *Sulphure* are principall Materials of *Metalls*; *Water* and *Oyle*, are principall Materials of *Vegetables* and *Animals*; And seeme to differ but in *Maturation*, or *Concoction*: *Flame* (in *Vulgar Opinion*) is but *Aire Incensed*; And they both have Quicknesse of Motion, and Facility of Cession, much alike: And the *Interstellar Skie*, (though the Opinion be vaine, that the *Starre* is the *Denser Part* of his *Orbe*) hath notwithstanding so much Affinity with the *Star*, that there is a Rotation of that, as well as of the *Starre*. Therefore, it is one of the greatest *Magnalia Naturæ*, to turne *Water*, or *Watry Iuyce*, into *Oile* or *Oily Iuyce*: Greater in Nature, than to turne *Siluer*, or *Quick-Siluer*, into *Gold*.

The Instances we have, wherein *Crude* and *Watry Substance* turneth into *Fat* and *Oily*, are of foure kinds. First in the *Mixture* of *Earth* and *Water*; which mingled by the helpe of the *Sunne*, gather a *Nitrous Fatnesse*, more than either of them have severally; As we see, in that they put forth *Plants*, which need both Iuyces.

The Second is in the *Assimilation* of *Nourishment*, made in the *Bodies* of *Plants*, and *Living Creatures*; Whereof *Plants* turne the Iuyce of meere *Water* and *Earth*, into a great deal of *Oily Matter*: *Living Creatures*,

Experiments
in Consort,
touching Sul-
phur and Mer-
cury, two of Pa-
racelsus Princi-
ples.

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tures, though much of their *Fat* and *Flesh*, are out of *Oily Aliments*, (as *Meat* and *Bread*) yet they Assimilate also in a Measure their *Drinke* of *Water*, &c. But these two Waies of *Version* of *Water* into *Oile*, (namely by *Mixture*, and by *Assimilation*) are by many *Passages*, and *Percolations*, and by long Continuance of soft *Heats*, and by *Circuits* of *Time*.

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The third is in the *Inception* of *Putrefaction*; As in *Water Corrupted*; And the *Mothers* of *Waters Distilled*; Both which haue a kinde of *Fatnesse* or *Oile*.

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The Fourth is in the *Dulcoration* of some *Metals*; As *Saccharum Saturni*, &c.

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The Intention of *Version* of *Water* into a more *Oily Substance*, is by *Disgestion*; For *Oile* is almost Nothing else but *Water digested*; And this *Disgestion* is principally by *Heat*; Which *Heat* must be either *Outward*, or *Inward*: Againe, it may be by *Prouocation*, or *Excitation*; Which is caused by the Mingling of *Bodies* already *Oily* or *Disgested*; For they will somewhat *Communicate* their *Nature* with the rest. *Disgestion* also is strongly effected by direct *Assimilation*, of *Bodies Crude* into *Bodies Disgested*; As in *Plants*, and *Living Creatures*, whose *Nourishment* is far more *Crude* than their *Bodies*: But this *Disgestion* is by a great *Compassse*, as hath beene said. As for the more full handling of these two *Principles*, whereof this is but a *Taste*; (the Enquiry of which is one of the *Profoundest Enquiries* of *Nature*) We leaue it to the *Title* of *Version* of *Bodies*; And likewise to the *Title* of the *First Congregations* of *Matter*; Which like a *Generall Assembly* of *Estates*, doth giue *Law* to all *Bodies*.

Experiment
Solitary tou-
ching *Chamele-*
ons.

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A *Chameleon* is a Creature about the Bignesse of an Ordinary *Lizard*: His Head vnproportionably big; His Eyes great: He moueth his Head without the writhing of his Necke (which is inflexible) as a *Hogge* doth: His Backe crooked; His Skin spotted with little Tumours, lesse Eminent neerer the Belly; his Taile slender, and long: On each Foot he hath fise Fingers; three on the Outside, and two on the Inside; His Tongue of a marvellous Length in respect of his Body, & hollow at the end; Which he will launch out to prey vpon *Flies*. Of Colour Greene, and of a dusky Yellow, brighter and whiter towards the Belly; Yet spotted with Blew, White, and Red. If hee bee laid vpon Greene, the Greene predominateth; If vpon Yellow, the Yellow; not so if he be laid vpon Blew, or Red, or White; Onely the Greene Spots receiue a more Orient Lustre: Laid vpon Blacke, he looketh all Blacke, though not without a Mixture of Greene. He feedeth not onely vpon Aire (though that be his principall Sustenance;) For sometimes hee taketh *Flies*, as was said; Yet some that haue kept *Chameleons* a whole yeere together, could neuer perceiue that euer they fed vpon any Thing else but Aire; And might obserue their Bellies to swell after they had exhausted the Aire, and closed their Iawes; Which they open commonly

monly against the Rayes of the Sunne. They haue a foolish Tradition in *Magicke*, that if a *Chameleon* be burnt vpon the Top of a House, it will raise a Tempest; Supposing (according to their vaine Dreames of *Sympathies*) because he nourisheth with Aire, his Body should haue great vertue to make Impression vpon the Aire.

IT is reported by one of the *Ancients*, that in Part of *Media*, there are *Eruptions* of *Flames* out of *Plaines*; And that those *Flames* are cleere, and cast not forth such Smoake, and Ashes, and Pumnice, as *Mountain* *Flames* doe. The Reason (no doubt) is, because the *Flame* is not pent, as it is in *Mountaines*, and *Earth-quakes* which cast *Flame*. There be also some *Blinde Fires*, vnder *Stone*, which flame not out, but *Oile* being powred vpon them, they flame out. The Cause whereof is, for that it seemeth, the *Fire* is so choaked, as not able to remoue the *Stone*, it is *Heat*, rather than *Flame*; Which neuerthelesse is sufficient to Enflame the *Oile*.

Experiment
Solitary touching
Subterranean
Fires.

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IT is reported, that in some *Lakes*, the *Water* is so *Nitrous*, as if Foulle *Cloaths* be put into it, it scoureth them of it selfe: And if they stay any whit long, they moulder away. And the Scouring Vertue of *Nitre* is the more to be noted, because it is a *Body Cold*; And we see *Warme Water* scoureth better than *Cold*. But the Cause is, for that it hath a Subtill Spirit, which seuereth and diuideth any thing that is foulle, and Viscous, and sticketh vpon a *Body*.

Experiment
Solitary touching
Nitre.

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TAKE a *Bladder*, the greatest you can get; Fill it full of Wind, and tye it about the Necke with a Silke thred waxed; And vpon that put likewise Wax very close; So that when the Necke of the *Bladder* drieth, no *Aire* may possibly get in, nor out. Then bury it three or foure foot vnder the *Earth*, in a *Vault*, or in a *Conservatory* of *Snow*, the *Snow* being made hollow about the *Bladder*; And after some Fortnights distance, see whether the *Bladder* be shrunke: For if it be, then it is plaine, that the *Coldnesse* of the *Earth*, or *Snow*, hath Condensed the *Aire*, and brought it a Degree neerer to *Water*: Which is an *Experiment* of great Consequence.

Experiment
Solitary touching
Congealing of
Aire.

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IT is a Report of some good credit, that in *Deepe Caves*, there are *Penfile Crystall*, and *Degrees* of *Crystall* that drop from aboue; And in some other, (though more rarely) that rise from below. Which though it be chiefly the Worke of Cold, yet it may bee, that *Water*, that passeth thorow the *Earth*, gathereth a Nature more clammy, and fitter to Congeale, and become Solid, than *Water* of it selfe. Therefore Triall would be made, to lay a Heape of *Earth*, in great Frosts, vpon a Hollow Vessell, putting a Canuase betweene, that it falleth not in: And powre *Water* vpon it, in such Quantity, as will be sure to soake thorow; And see whether it will not make an harder Ice in the bottome of the Vessel,

Experiment
Solitary touching
Congealing of
Water into
Crystall.

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and lesse apt to dissolue, than ordinarily. I suppose also, that if you make the Earth narrower at the bottome, than at the Top, in fashion of a Sugar Loafe Reuersed, it will helpe the Experiment. For it will make the Ice, where it Issueth, lesse in Bulke; And euermore Smalnesse of Quantity is a Helpe to *Version*.

Experiment
Solitary tou-
ching *Prefer-*
ring of *Rose-*
leaves, both in
Colour & Smell.

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TAke *Damaske Roses*, and pull them; Then dry them vpon the Top of an House, vpon a Lead or Tarras, in the hot Sunne, in a cleere day, betweene the Houres (onely) of twelue and two; or thereabouts. Then put them into a Sweet Dry *Earthen Bottle*, or a *Glasse*, with narrow Mouthes, stuffing them close together, but without Bruising: Stop the *Bottle*, or *Glasse* close, and these *Roses* will retaine, not onely their Smell Perfect, but their Colour fresh, for a yeere at least. Note, that Nothing doth so much destroy any Plant, or other Body, either by *Putrefaction*, or *Arefaction*, as the *Aduentitious Moisture*, which hangeth loose in the Body, if it be not drawne out. For it betrayeth and tolleth forth the *Innate* and *Radicall Moisture*, along with it, when it selfe goeth forth. And therefore in *Living Creatures*, Moderate Sweat doth preserue the Iuyce of the Body. Note that these *Roses*, when you take them from the *Drying*, haue little or no Smell; So that the Smell is a Second Smell, that issueth out of the *Flower* afterwards.

Experiments
in Consort
touching the
Continuance of
Flame.

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THe Continuance of Flame, according vnto the diuersity of the Body Enflamed, & other Circumstances, is worthy the Enquiry; Chiefly, for that though Flame be (almost) of a Momentany Lasting, yet it receiueth the More, and the Lesse: we will first therefore speake (at large) of Bodies Enflamed, wholly, and Immediatly, without any *Wicke* to helpe the *Inflammation*. A Spoonfull of *Spirit of Wine*, a little heated, was taken, and it burnt as long as came to 116. Pulses. The same Quantity of *Spirit of Wine*, Mixed with the Sixth Part of a Spoonfull of *Nitre*, burnt but to the space of 94. Pulses. Mixed with the like Quantity of *Bay-salt*, 83. Pulses. Mixed with the like Quantity of *Gunpowder*, which dissolued into a Black water, 110. Pulses. A Cube, or Pellet of *Yellow Wax*, was taken, as much as halfe the *Spirit of Wine*, and set in the Middest, and it burnt onely to the space of 87. Pulses. Mixed with the Sixth Part of a spoonfull of *Milke*, it burnt to the space of 100. Pulses; And the *Milke* was crudled. Mixed with the Sixth Part of a spoonfull of *Water*, it burnt to the space of 86. Pulses; With an Equall Quantity of *Water*, onely to the space of 4. Pulses. A small *Pebble* was laid in the Middest; and the *Spirit of Wine* burnt to the space of 94. Pulses. A Peece of *Wood*, of the bignesse of an Arrow, and about a Fingers length, was set vp in the Middest, and the *Spirit of Wine* burnt to the space of 94. Pulses. So that the *Spirit of Wine Simple*, endured the longest; And the *Spirit of Wine* with the *Bay-salt*, and the Equall Quantity of *Water*, were the shortest.

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Consider well, whether the more speedy Going forth of the flame, bee caused,

caused, by the *Greater Vigour* of the *Flame* in *Burning*; Or by the *Resistance* of the *Body mixed*, and the *Aversion* thereof to take *Flame*: Which will appeare by the *Quantity* of the *Spirit* of *Wine*, that remaineth after the *Going out* of the *Flame*. And it seemeth clearly to be the latter; For that the *Mixture* of Things least apt to burne, is the *Speediest* in going out. And note, by the way, that *Spirit* of *Wine* burned, till it goe out of it selfe, will burne no more; And tasteth nothing so hot in the Mouth, as it did; No nor yet sowre, (as if it were a degree towards *Vineger*.) which *Burnt Wine* doth; but flat and dead.

Note, that in the *Experiment* of *Wax* aforesaid, the *Wax* dissolued in the burning, and yet did not incorporate it selfe, with the *Spirit* of *Wine*, to produce one *Flame*; but wheresoever the *Wax* floated, the *Flame* forsooke it, till at last it spread all ouer, and put the *Flame* quite out.

The *Experiments* of the *Mixtures* of the *Spirit* of *Wine* enflamed, are Things of *Discoverie*, and not of *Vse*: But now we will speake of the *Continuance* of *Flames*, such as are vsed for *Candles*, *Lampes*, or *Tapers*; consisting of *Inflammable Matters*, and of a *Wicke* that prouoketh *Inflammation*. And this importeth not only *Discoverie*, but also *Vse* and *Profit*; For it is a great *Sauing*, in all such *Lights*, if they can be made as faire and bright as others, and yet last longer. *Wax Pure* made into a *Candle*, and *Wax Mixed* seuerally into *Candle-stuffe*, with the *Particulars* that follow; (viz. *Water*, *Aqua-vita*, *Milke*, *Bay-salt*, *Oyle*, *Butter*, *Nitre*, *Brimstone*, *Saw-dust*.) Euery of these bearing a *Sixth Part* to the *Wax*; And euery of these *Candles mixed*, being of the same *Weight* and *Wicke* with the *Wax Pure*, proued thus in the *Burning*, and *Lasting*. The *Swiftest* in *Consuming* was that with *Saw-dust*; Which first burned faire, till some part of the *Candle* was consumed, and the *Dust* gathered about the *Snafte*; But then it made the *Snafte* bigge, and long, and to burne dusky, and the *Candle* wasted in halfe the time of the *Wax Pure*. The next in *Swiftnesse*, were the *Oyle*, and *Butter*, which consumed, by a *Fifth part*, swifter than the *Pure Wax*. Then followed in *Swiftnesse* the *Cleare Wax* it selfe. Then the *Bay-Salt*, which lasted about an *Eighth part* longer than the *Cleare Wax*. Then followed the *Aqua-vita*, which lasted about a *Fifth part* longer than the *Cleare Wax*. Then followed the *Milke*, and *Water*, with little difference from the *Aqua-vita*, but the *Water* slowest. And in these foure last, the *Wicke* would spit forth little *Sparkes*. For the *Nitre*, it would not hold lighted aboue some *Twelue Pulses*; But all the while it would spit out *Portions* of *Flame*, which afterwards would goe out into a *vapour*. For the *Brimstone*, it would hold lighted, much about the same time with the *Nitre*; But then after a little while, it would harden and cake about the *Snafte*; So that the *Mixture* of *Bay-Salt* with *Wax*, will win an *Eighth part* of the time of *lasting*, and the *Water* a *Fifth*.

After the *Seuerall Materialls* were tried, *Triall* was likewise made of *seuerall Wickes*; As of *Ordinary Cotton*; *Sowing Thred*; *Rush*; *Silke*; *Straw*; and *Wood*. The *Silke*, *Straw*, and *Wood*, would flame a little, till they

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they came to the *Wax*, and then goe out: of the Other Three, the *Thred* consumed faster than the *Cotton*, by a Sixth part of Time: The *Cotton*, next: Then the *Rush* consumed slower than the *Cotton*, by at least a third part of time. For the Bignesse of the *Flame*, the *Cotton*, and *Thred*, cast a *Flame* much alike; and the *Rush* much lesse, and dimmer. *Quare*, whether *Wood*, and *Wickes* both, as in *Torches*, consume faster, than the *Wickes Simple*?

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We haue spoken of the Seuerall *Materialls*, and the Seuerall *Wickes*: But to the *lasting* of the *Flame*, it importeth also; Not only what the *Materiall* is, but in the same *Materiall*, whether it be Hard, Soft, Old, New, &c. Good *House-wines*, to make their *Candles* burne the longer, vse to lay them (one by one) in *Bran*, or *Flower*, which make them harder, and so they Consume the slower: In so much, as by this meanes, they will outlast other *Candles*, of the same *Stuffe*, almost Halfe in Halfe. For *Bran* and *Flower* haue a Vertue to Harden: So that both Age, and lying in the *Bran*, doth helpe to the Lasting. And we see that *Wax Candles* last longer than *Tallow Candles*, because *Wax* is more firme, and hard.

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The *Lasting* of *Flame* also dependeth vpon the *ease* Drawing of the *Nourishment*; As we see in the *Court of England*, there is a Seruice which they call *All-night*; which is (as it were) a great Cake of *Wax*, with the *Wicke* in the Middest; whereby it commeth to passe, that the *Wicke* fetcheth the *Nourishment* further off. We see also that *Lamps* last longer, because the *Vessell* is farre broader, than the Breadth of a *Taper*, or *Candle*.

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Take a *Turreted Lampe* of *Tinne*, made in the forme of a *Squire*; The Heighth of the *Turret* being thrice as much, as the length of the lower part, whereupon the *Lampe* standeth: Make only one Hole in it, at the End of the *Returne* furthest from the *Turret*. Reuerse it, and fill it full of *Oile*, by that Hole; And then set it vpright againe; And put a *Wicke* in at the Hole; And lighten it: You shall finde that it will burne slow, and a long time. Which is caused, (as was said last before,) for that the *Flame* fetcheth the *Nourishment* a farre off. You shall finde also, that as the *Oile* wasteth, and descendeth, so the Top of the *Turret*, by little and little, filleth with *Aire*; which is caused by the Rarefaction of the *Oile* by the Heat. It were worthy the Obseruation, to make a Hole, in the Top of the *Turret*, and to trie, when the *Oile* is almost consumed, whether the *Aire* made of the *Oile*, if you put to it a *Flame* of a *Candle*, in the letting of it forth, will Enflame. It were good also to haue the *Lampe* made, not of *Tinne*, but of *Glasse*, that you may see how the Vapour, or *Aire* gathereth, by degrees, in the Top.

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A Fourth Point, that importeth the *lasting* of the *Flame*, is the *Closeth* of the *Aire*, wherein the *Flame* burneth. We see, that if *Wind* bloweth vpon a *Candle*, it wasteth apace. Wee see also, it lasteth longer in a *Lanthorne*, than at large. And there are Traditions of *Lampes*, and *Candles*, that haue burnt a very long time, in *Caves*, and *Tombes*.

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A Fifth Point, that importeth the *Lasting* of the *Flame*, is the *Nature* of

of the *Aire*, where the *Flame* burneth; whether it be Hot or Cold; Moist or Drie. The *Aire*, if it be very *Cold*, irritateth the *Flame*, and maketh it burne more fiercely; (As Fire scorseth in Frosty weather;) And so furthereth the *Consumption*. The *Aire* once heated, (I conceiue) maketh the *Flame* burne more mildly, and so helpeth the *Continuance*. The *Aire*, if it be *Drie*, is indifferent: The *Aire*, if it be *Moist*, doth in a Degree quench the *Flame*: (As we see *Lights* will goe out in the *Damps* of *Mines*;) And howsoeuer maketh it burne more dully: And so helpeth the *Continuance*.

Burials in *Earth* serue for *Preseruation*; And for *Condensation*; And for *Induration* of *Bodies*. And if you intend *Condensation*, or *Induration*, you may bury the *Bodies* so, as *Earth* may touch them: As if you will make *Artificiall Porcellane*, &c. And the like you may doe for *Conseruation*, if the *Bodies* be Hard and Solid, As Clay, Wood, &c. But if you intend *Preseruation* of *Bodies*, more Soft and Tender, then you must doe one of these two: Either you must put them in *Cases*, whereby they may not touch the *Earth*; Or else you must vault the *Earth*, whereby it may hang ouer them, and not touch them; For if the *Earth* touch them, it will doe more hurt, by the Moisture, causing them to putrifie, than good by the virtuall Cold, to conserue them; Except the *Earth* be very Drie, and Sandie.

An *Orange*, *Limon*, and *Apple*, wrapt in a Linnen Cloth, being buried for a Fortnights Space, foure foot deepe within the *Earth*, though it were in a Moist Place, and a Rainie Time, yet came forth, no wayes Mouldie, or Rotten, but were become a little harder than they were; Otherwise fresh in their Colour; But their Iuyce somewhat flatted. But with the *Buriall* of a Fortnight more they became Putrified.

A *Bottle* of *Beere*, buried in like manner, as before, became more liuely, better tasted, and Clearer, than it was. And a *Bottle* of *Wine* in like manner. A *Bottle* of *Vinegar*, so buried, came forth more liuely, and more Odoriferous, smelling almost like a *Violer*. And after the whole Moneths *Buriall*, all the Three came forth, as fresh and liuely, if not better, than before.

It were a profitable *Experiment*, to preserue *Oranges*, *Lemons*, and *Pomgranates*, till Summer; For then their Price will be mightily increased. This may be done, if you put them in a Pot or Vessell, well couered; that the *Moisture* of the *Earth* come not at them; Or else by putting them in a *Conseruatory* of *Snow*. And generally, whosoever will make *Experiments* of Cold, let him be prouided of three Things; A *Conseruatory* of *Snow*; A good large *Vault*, twenty foot at least vnder the Ground; And a Deepe Well.

There hath beene a Tradition, that *Pearle*, and *Corall*, and *Turchois-Stone*, that haue lost their Colours, may be recovered by *Burying* in the *Earth*: Which is a thing of great profit, if it would sort: But vpon Triall of Six Weekes *Buriall*, there followed no Effect. It were good to trie it;

Experiments
in Consort tou-
ching Burialls
or Infusions of
diuers Bodies in
Earth.

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Experiment
Solitary tou-
ching the Af-
fects in Mens
Bodies from Se-
uerall Winds.

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in a Deepe Well; Or in a *Conseruatory* of *Snow*, where the Cold may be more Constringent; And so make the *Body* more vnited, and thereby more Resplendent.

Mens Bodies are heauier, and lesse disposed to Motion, when *Southerne Winds* blow, than when *Northerne*. The Cause is, for that when the *Southerne Winds* blow, the Humours doe (in some Degree) melt, and wax fluide, and so flow into the Parts; As it is seene in *Wood*, and other Bodies; which, when the *Southerne winds* blow, doe swell. Besides, the Motion and Actiuitie of the Body consisteth chiefly in the *Sinewes*, which, when the *Southerne Wind* bloweth, are more relax.

Experiment
Solitary tou-
ching *Winter*
and *Summer*
Sickenesses.

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IT is commonly seene, that more are *Sicke* in the *Summer*, and more *Dye* in the *Winter*; Except it be in *Pestilent Diseases*, which commonly reigne in *Summer*, or *Autumne*. The Reason is, because *Diseases* are bred (indeed) chiefly by *Heat*; But then they are Cured most by *Sweat*, and *Purge*; which in the *Summer* commeth on, or is prouoked, more Easily: As for *Pestilent Diseases*, the Reason why most Die of them in *Summer*, is because they are bred most in the *Summer*; For otherwise those that are touched are in most Danger in the *Winter*.

Experiment
Solitary tou-
ching *Pestilent*
Seasons.

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THe Generall Opinion is, that *Yeares Hot* and *Moist*, are most *Pestilent*; Vpon the Superficiall Ground, that *Heat* and *Moisture* cause *Putrefaction*. In *England* it is found not true; For, many times, there haue beene great *Plagues* in *Drie Yeares*. Whereof the Cause may be, for that *Drought* in the Bodies of *Islanders*, habituate to *Moist Aires*, doth Exasperate the Humours, and maketh them more apt to Putrifie, or Effluame: Besides, it tainteth the *Waters* (commonly,) and maketh them lesse wholesome. And againe in *Barbary*, the *Plagues* breake vp in the *Summer-months*, when the *Weather* is *Hot* and *Dry*.

Experiment
Solitary tou-
ching an Error
receiued about
Epidemicall Dis-
eases.

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MAny *Diseases*, (both *Epidemicall*, and others,) breake forth at *Particular times*. And the Cause is falsely imputed to the *Constitution* of the *Aire*, at that time, when they breake forth, or reigne; whereas it proceedeth (indeed) from a *Precedent Sequence*, and *Series* of the *Seasons* of the *Yeare*: And therefore *Hippocrates*, in his *Prognosticks*, doth make good Observations, of the *Diseases*, that ensue vpon the *Nature*, of the *Precedent foure Seasons* of the *Yeare*.

Experiment
Solitary tou-
ching the Alie-
ration or or Pre-
seruation of Li-
quors in Wells,
or deepe Vaults.

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TRiall hath been made, with *Earthen Bottles* well stopped, hanged in a *Well* of *Twenty Fathome* deep, at the least; And some of the *Bottles* haue beene let downe into the *Water*, some others haue hanged a-boue, within about a fathome of the *Water*; And the *Liquors* so tryed haue beene, *Beere*, (not New, but Ready for drinking,) and *Wine*, and *Milke*. The Prooofe hath beene, that both the *Beere*, and the *Wine*, (as well within *Water*, as a-boue,) haue not been palled or deaded at all; But

as

as good or somewhat better, than *Bottles* of the same *Drinkes*; and *Stale* nesse, kept in a *Celler*. But those which did hang about *Water*, were apparently the best; And that *Beere* did flower a little; wheteas that vnder *Water* did not, though it were *Fresh*. The *Milke* sowed, and began to *Putrifie*. Neuerthelesse it is true, that there is a *Village* neare *Bliss*, where in *Deepe Caues* they doe thicken *Milke*; In such sort, that it becommeth very pleasant; Which was some *Cause* of this *Triall* of *Hanging Milke* in the *Well*: But our prooffe was naught: Neither doe I know, whether that *Milke* in those *Caues*, be first boiled. It were good therefore to try it with *Milke* Soden, and with *Creame*; For that *Milke* of it selfe is such a *Compound Body*, of *Creame*, *Curds*, and *Whey*, as it is easily *Turned*, and *Dissolued*. It were good also to trie the *Beere*, when it is in *Wort*, that it may be seene, whether the *Hanging* in the *Well*, will *Accelerate* the *Ripening* and *Clarifying* of it.

Diuers, we see, doe *Stut*. The *Cause* may be, (in most,) the *Refrigeration* of the *Tongue*; Whereby it is lesse apt to moue. And therefore we see, that *Naturalls* doe generally *Stut*: And we see that in those that *Stut*, if they drinke *Wine* moderately, they *Stut* lesse, because it heateth: And so we see, that they that *Stut*, doe *Stut* more in the first *Offer* to speake, than in *Continuance*; Because the *Tongue* is, by *Motion*, somewhat heated. In some also, it may be, (though rarely,) the *Driness* of the *Tongue*; which likewise maketh it lesse apt to moue, as well as *Cold*; For it is an *Affect* that commeth to some *Wise* and *Great Men*; As it did vnto *Moses*, who was *Lingua prapedita*; And many *Stutters* (we finde) are very *Cholericke Men*; *Choler* Enducing a *Driness* in the *Tongue*.

Smells, and other *Odours*, are *Sweeter* in the *Aire*, at some *Distance*, than neare the *Nose*; As hath beene partly touched heretofore. The *Cause* is double; First the finer *Mixture*, or *Incorporation* of the *Smell*: For we see that in *Sounds* likewise, they are *Sweetest*, when we cannot heare euery *Part* by it selfe. The other *Reason* is, for that all *Sweet Smells* haue ioyned with them, some *Earthy* or *Crude Odours*; And at some distance the *Sweet*, which is the more *Spiritually*, is *Perceiued*; And the *Earthy* reacheth not so farre.

Sweet Smells are most forcible, in *Drie Substances*, when they are *Broken*; And so likewise in *Orenges*, or *Lemons*, the *Nipping* of their *Rinde*, giueth out their *Smell* more: And generally, when *Bodies* are *Moued* or *Stirred*, though not *Broken*, they *Smell* more; As a *Sweet-Bagge* waued. The *Cause* is double: The one, for that there is a *Greater Emission* of the *Spirit*, when *Way* is made: And this holdeth in the *Breaking*, *Nipping*, or *Crushing*; It holdeth also, (in some *Degree*) in the *Mouing*: But in this last, there is a *Concurrence* of the *Second Cause*; Which is the *Impulsion* of the *Aire*, that bringeth the *Scent* faster vpon vs.

The daintiest *Smells* of *Flowers*, are out of those *Plants*, whose *Leaues* smell not; As *Violets*, *Roses*, *Wall-flowers*, *Gilly-flowers*, *Pinckes*, *Woodbines*, *Vine*-

Experiment
Solitary touch-
ing. Stutting.

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Experiments
in Consort,
touching Smells.

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Vine-flowers, Apple-Bloomes, Lime-Tree Bloomes, Beane-Bloomes, &c. The Cause is, for that where there is Heat and strength enough in the *Plant*, to make the *Leaves Odorate*, there the *Smell* of the *Flower* is rather Euanide and Weaker, than that of the *Leaves*; As it is in *Rose-Mary-Flowers, Lavender-Flowers, and Sweet-Briar-Roses*. But where there is lesse Heat, there the *Spirit* of the *Plant*, is digested and refined, and seuered from the Grosser Iuyce, in the *Efflorescence*, and not before.

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Most *Odours* smell best, *Broken* or *Crusht*, as hath beene said; But *Flowers Pressed* or *Beaten*, doe leese the Freshnesse and Sweetnesse of their *Odour*. The Cause is, for that when they are *Crushed*, the Grosser and more *Earthy Spirit* commeth out with the Finer, and troubleth it; Whereas in stronger *Odours* there are no such Degrees of the Issue of the *Smell*.

Experiments
in Confort tou-
ching the Good-
nesse and Choyce
of Water.

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IT is a thing of very good Vse, to Discouer the Goodnesse of *Waters*. The *Taste*, to those that Drinke *Water* only, doth somewhat: But other *Experiments* are more sure. First, trie *Waters* by *Weight*; Wherein you may finde some difference, though not much: And the *Lighter* you may account the Better.

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Secondly, try them by *Boyling* vpon an *Equall Fire*: And that which consumeth away fastest, you may account the Best.

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Thirdly, trie them in *Seuerall Bottles*, or *Open Vessells*, Matches in euery Thing else, and see which of them *Last Longest*, without *Stench* or *Corruption*. And that which holdeth *Vnputrified* longest, you may likewise account the Best.

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Fourthly, trie them by *Making Drinckes* Stronger, or Smaller, with the same *Quantitie* of *Mault*; And you may conclude, that that *Water*, which maketh the *Stronger Drinke*, is the more *Concocted*, and *Nourishing*; though perhaps it be not so good for *Medicinall use*. And such *Water* (commonly) is the *Water* of *Large* and *Nauigable Rivers*: And likewise in *Large* and *Cleane Ponds* of *Standing Water*: For vpon both them, the *Sunne* hath more power, than vpon *Fountaines*, or *Small Rivers*. And I conceive that *Chalke-water* is next them the best, for going furthest in *Drinke*: For that also helpeth *Concoction*; So it be out of a *Deepe Well*; For then it Cureth the *Rawnesse* of the *Water*; But *Chalkie Water*, towards the *Top* of the *Earth*, is too fretting; As it appeareth in *Laundry* of *Cloaths*, which weare out apace, if you vse such *Waters*.

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Fifthly, The *Houswiues* doe finde a Difference in *Waters*, for the *Bearing*, or *Not Bearing* of *Soape*: And it is likely that the more *Fat Water* will beare *Soape* best; For the *Hungry Water* doth kill the *Vnctuous Nature* of the *Soape*.

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Sixthly, you may make a Iudgement of *Waters*, according to the *Place*, whence they *Spring*, or *Come*: The *Rain-Water* is, by the *Physicians*, esteemed the *Finest*, and the best; But yet it is said to putrifie soonest; which is likely, because of the *Finenesse* of the *Spirit*: And in *Con-*

seruatories

seruatories of *Rain-water*, (such as they haue in *Venice*, &c.) they are found not so *Choice Waters*; The worse, (perhaps,) because they are Couered aloft, and kept from the Sunne. *Snow-water* is held vnholsome; In so much as the People, that dwell at the Foot of the *Snow-Mountaines*, or otherwise vpon the Ascent (especially the Women) by drinking of *Snow-water*, haue great Bags hanging vnder their Throats. *Well-water*, except it be vpon *Chalke*, or a very plentiful Spring, maketh Meat Red; which is an ill Signe. *Springs* on the *Tops* of *High-Hills* are the best: For both they seeme to haue a Lightnesse, and Appetite of Mounting; And besides they are most pure and Vnmingled; And againe are more Percolated thorow a great Space of Earth. For *Waters* in *Vallies*, ioyne in effect vnder Ground with all *Waters* of the same Leuell; Whereas *Springs*, on the *Tops* of *Hills*, passe thorow a great deale of Pure *Earth*, with lesse Mixture of other *Waters*.

Seuenthly, Iudgement may be made of *Waters*, by the *Soile* whereupon the *Water* runneth; As *Pebble* is the Cleanest, and best tasted; And next to that *Clay-water*; And Thirdly, *Water* vpon *Chalke*; Fourthly, that vpon *Sand*; And Worst of all vpon *Mud*. Neither may you trust *Waters* that Taste Sweet; For they are commonly found in Rising Grounds of great *Cities*; which must needs take in a great deale of Filth.

IN *Peru*, and diuers Parts of the *West Indies*, though vnder the *Line*, the *Heats* are not so Intolerable, as they be in *Barbary*, and the Skirts of the *Torrid Zone*. The *Causes* are, First the Great *Brizes*, which the Motion of the Aire in great Circles, (such as are vnder the *Girdle* of the *World*,) produceth; Which doe refrigerate; And therefore in those Parts Noone is nothing so hot, when the *Brizes* are great, as about Nine or Ten of the Clocke in the Fore-Noone. Another *Cause* is, for that the Length of the Night, and the Dewes thereof, doe compense the *Heat* of the Day. A third *Cause* is the Stay of the Sunne; Not in Respect of Day and Night, (for that we spake of before,) but in Respect of the Season; For vnder the *Line*, the Sunne crosseth the *Line*, and maketh two Summers, and two Winters; But in the Skirts of the *Torrid Zone*, it doubleth, and goeth backe againe, and so maketh one Long Summer.

THE *Heat* of the *Sunne* maketh *Men Blacke* in some Countries, as in *Ethiopia*, and *Ginny*, &c. *Fire* doth it not, as we see in *Glasse-Men*, that are continually about the *Fire*. The *Reason* may be, because *Fire* doth licke vpon the *Spirits*, and *Bloud* of the Body, so as they Exhale; So that it euer maketh *Men* looke Pale, and Sallow; But the *Sunne*, which is a Gentler Heat, doth but draw the *Bloud* to the Outward *Parts*; And rather Concocteth it, than Soaketh it: And therefore we see that all *Ethiopes* are Flethy, and Plumpe, and haue great Lips; All which betoken *Moisture* retained, and not drawne out. We see also, that the

Experiment
Solitary tou-
ching the Tem-
perate Heat vn-
der the Equi-
noctiall.
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Experiment
Solitary tou-
ching the Tem-
perate Heat vn-
der the Equi-
noctiall.

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Experiment
Solitary tou-
ching the Colo-
ration of Blacke
and Tawney
Moores.

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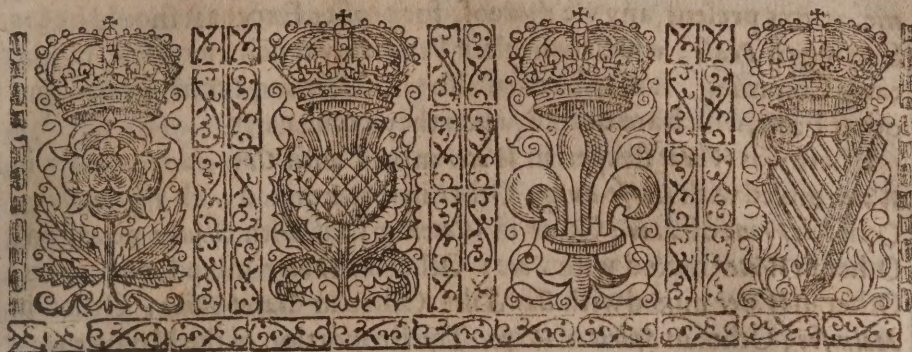
Negroes are bred in Countries that haue Plenty of *Water*, by *Rivers* or otherwise: For *Meroë*, which was the *Metropolis* of *Aethiopia*, was vpon a great Lake: And *Congo*, where the *Negroes* are, is full of *Rivers*. And the *Confines* of the *Riuer Niger*, where the *Negroes* also are, are well watered: And the Region about *Capo Verde*, is likewise Moist, in so much as it is pestilent through Moisture: But the Countries of the *Abyssenes*, and *Barbary*, and *Peru*, where they are Tawney, and Oliuaster, and Pale, are generally more Sandy and Dry. As for the *Athiopes*, as they are Plumpe, and Flethy; So (it may be) they are Sanguine, and ruddy Coloured, if their blacke Skin would suffer it to be seene.

Experiment
Solitary tou-
ching Motion
after the In-
flant of Death.

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SOME *Creatures* doe moue a good while after their Head is off; As *Birds*; Some a very little time; As *Men*, and all beasts; Some moue, though cut in seuerall Peeces; As *Snakes*, *Eeles*, *Wormes*, *Flies*, &c. First therefore it is certaine, that the *Immediate Cause* of *Death*, is the Resolution or Extinguishment of the *Spirits*; And that the Destruction or Corruption of the *Organs*, is but the *Mediate Cause*. But some *Organs* are so peremptorily necessary, that the Extinguishment of the *Spirits* doth speedily follow; But yet so, as there is an *Interim* of a Small Time. It is reported by one of the *Ancients*, of credit, that a *Sacrificed Beast* hath lowed, after the Heart hath beene seuered; And it is a Report also of Credit, that the *Head* of a *Pig* hath beene opened, and the Braine put into the Palme of a Mans hand, trembling, without breaking any part of it, or seuering it from the Marrow of the Back-bone; During which time the *Pig* hath beene, in all appearance, starke dead, and without Motion; And after a small Time the Braine hath beene replaced, and the Skul of the *Pig* closed, and the *Pig* hath a little after gone about. And certaine it is, that an *Eye* vpon *Reuenge* hath beene thrust forth, so as it hanged a pretty distance by the *Visuall Nerue*; And during that time the *Eye* hath beene without any Power of *Sight*; And yet after (being replaced) recouered *Sight*. Now the *Spirits* are chiefly in the *Head*, and *Cells* of the *Braine*, which in *Men*, and *Beasts* are Large; And therefore, when the *Head* is off, they moue little or Nothing. But *Birds* haue small *Heads*, and therefore the *Spirits* are a little more dispersed in the *Sinewes*, whereby Motion remaineth in them a little longer; In so much as it is Extant in Story, that an *Emperour* of *Rome*, to shew the Certainty of his Hand, did Shoot a great Forked Arrow at an *Estrich*, as she ranne swiftly vpon the Stage, and strooke off her Head; And yet she continued the Race, a little way, with the Head off. As for *Wormes*, and *Flies*, and *Eeles*, the *Spirits* are diffused almost all ouer; And therefore they moue in their Seuerall Peeces.

NATV-



NATVRALL HISTORIE.

V. Century.



E will now enquire of *Plants* or *Vegetables*: And we shall doe it with diligence. They are the principall Part of the *Third Daies Worke*. They are the first *Producat*, which is the Word of *Animation*: For the other Words are but the Words of *Essence*; And they are of excellent and generall Use, for Food, Medicine, and a Number of Mechanicall Arts.

There was sowne in a *Bed*, *Turnip-Seed*, *Radish-Seed*, *Wheat*, *Cucumber-Seed*, and *Pease*. The *Bed* we call a *Hot-Bed*, and the Manner of it is this. There was taken *Horse-dung*, old, and well rotted; This was laid vpon a Banke, halfe a foot high, & supported round about with Planks; And vpon the Top was cast Sifted Earth, some two Fingers deep; And then the *Seed* sprinkled vpon it, hauing beene steeped all night in *Water* Mixed with *Cow-dung*. The *Turnip-Seed*, and the *Wheat* came vp halfe an Inch aboue Ground, within two daies after, without any Watring. The Rest the third day. The *Experiment* was made in *October*; And (it may be) in the *Spring*, the *Accelerating* would haue beene the speedier. This is a Noble *Experiment*; For without this helpe, they would haue

Experiments
in Consort
touching the
Acceleration of
Germination.

beene foure times as long in comming vp. But there doth not occur to me, at this present, any vse thereof, for profit; Except it should be for Sowing of *Pease*; which haue their Price very much increased, by the early Comming. It may be tried also with *Cherries*, *Straw-berries*, and other Fruit, which are dearest, when they come early.

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There was *Wheat* steeped in *Water* mixed with *Cow-dung*; Other in *Water* mixed with *Horse-dung*; Other in *Water* mixed with *Pigeon-dung*; Other in *Urine* of *Man*; Other in *Water* mixed with *Chalke* powdred; Other in *Water* mixed with *Soot*; Other in *Water* mixed with *Asbes*; Other in *Water* mixed with *Bay-Salt*; Other in *Claret Wine*; Other in *Malmsey*; Other in *Spirit* of *Wine*. The Proportion of the Mixture was, a fourth Part of the Ingredients to the *Water*; Saue that there was not of the *Salt* above an eighth Part. The *Urine*, and *Wines*, and *Spirit* of *Wine*, were Simple without Mixture of *Water*. The Time of the Steeping was twelue houres. The Time of the Yeere *October*. There was also other *Wheat* sowne vnsteeped, but watered twice a day with *Warme water*. There was also other *Wheat* sowne Simple to compare it with the rest. The Euent was; That those that were in the Mixture of *Dung*, and *Urine*, and *Soot*, *Chalke*, *Asbes*, and *Salt*, came vp within six daies: And those that afterwards proued the Highest, Thickest, and most Lustie, were; First the *Urine*; And then the *Dungs*; Next the *Chalke*; Next the *Soot*; Next the *Asbes*; Next the *Salt*; Next the *Wheat* Simple of it selfe, vnsteeped, and vnwatered; Next the *Watered* twice a day with warme water; Next the *Claret Wine*. So that these three last were flower than the ordinary *Wheat* of it selfe; And this Culture did rather retard, than aduance. As for those that were steeped in *Malmsey*, and *Spirit* of *Wine*, they came not vp at all. This is a Rich Experiment for Profit: For the most of the Steepings are Cheape Things; And the Goodnesse of the Crop is a great Matter of Gaine; If the Goodnesse of the Crop answer the Earlinesse of the Comming vp: As it is like it will; Both being from the vigour of the *Seed*; Which also partly appeared in the Former Experiments, as hath beene said. This Experiment would be tried in other *Graines*, *Seeds*, and *Kernels*: For it may be some Steeping will agree best with some *Seeds*. It would be tried also with *Roots* steeped as before, but for longer time. It would bee tried also in Senerall Seasons of the Yeere, especially the *Spring*.

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Strawberries watered now and then (as once in three daies) with *Water*, wherein hath beene steeped *Sheepes-dung*, or *Pigeons-dung*, will preuent and come early. And it is like, the same Effect would follow in other *Berries*, *Herbs*, *Flowers*, *Graines*, or *Trees*. And therefore it is an Experiment, though vulgar in *Strawberries*, yet not brought into vse generally: For it is vsuall to helpe the Ground with *Mucke*; And likewise to Recomfort it sometimes with *Mucke* put to the *Roots*; But to water it with *Mucke water*, which is like to bee more Forcible, is not practised.

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Dung, or *Chalke*, or *Blond*, applied in Substance, (seasonably) to the *Roots*

Roots of Trees, doth set them forwards. But to doe it vnto *Herbs*, without Mixture of *Water* or *Earth*, it may bee these Helpes are too Hot.

The former *Meanes* of Helping *Germination*, are either by the *Goodnesse* and *Strength* of the *Nourishment*; Or by the *Comforting*, and *Exciting* the *Spirits* in the *Plant*, to draw the *Nourishment* better. And of this latter kinde, concerning the *Comforting* of the *Spirits* of the *Plant*, are also the experiments that follow; Though they be not Applications to the *Root*, or *Seed*. The *Planting* of *Trees* warme vpon a *Wall*, against the *South*, or *South-East* *Sunne*, doth hasten their *Comming* on, and *Ripening*; And the *South-East* is found to be better than the *South-West*, though the *South-West* be the *Hotter* Coast. But the cause is chiefly, for that the *Heat* of the *Morning* succeedeth the *Cold* of the *Night*: and partly, because (many times) the *South-west* *Sunne* is too *Parching*. So likewise the *Planting* of them vpon the *Backe* of a *Chimney*, where a *Fire* is kept, doth hasten their *Comming* on, and *Ripening*: Nay more, the *Drawing* of the *Boughes* into the *Inside* of a *Roome*, where a *Fire* is continually kept, worketh the same Effect; Which hath beene tried with *Grapes*; In so much as they will come a *Moneth* earlier, than the *Grapes* abroad.

Besides the two *Meanes* of *Accelerating Germination*, formerly described; That is to say, the *Mending* of the *Nourishment*; and *Comforting* of the *Spirit* of the *Plant*; there is a *Third*; Which is the *Making way* for the *Easie Comming* to the *Nourishment*, and *Drawing* it. And therefore *Gentle Digging* and *Loosening* of the *Earth* about the *Roots* of *Trees*; And the *Remouing* *Herbs* and *Flowers* into new *Earth*, once in two yeeres, (which is the same thing; For the new *Earth* is euer looser) doth greatly further the *Prospering*, and *Earlinesse* of *Plants*.

But the most admirable *Acceleration* by *Facilitating* the *Nourishment*, is that of *Water*. For a *Standard* of a *Damaske Rose* with the *Root* on, was set in a *Chamber*, where no *Fire* was, vpright in an *Earthen Panne*, full of *Faire Water*, without any Mixture, halfe a foot vnder the *Water*, the *Standard* being more than two foot high aboue the *Water*: Within the Space of ten daies, the *Standard* did put forth a faire *Greene* leafe, and some other little *Buds*, which stood at a stay, without any Shew of decay or withering, more than seuen Daies. But afterwards that *Leafe* faded, but the young *Buds* did sprout on; which afterward opened into faire *Leaues*, in the space of three *Moneths*; And continued so a while after; till vpon *Remouall* wee left the *Triall*. But note that the *Leaues* were somewhat paler, and lighter-coloured, than the *Leaues* vse to bee abroad. Note that the first *Buds* were in the End of *October*; And it is likely that if it had beene in the *Spring* time, it would haue put forth with greater strength, and (it may bee) to haue growne on to beare *Flowers*. By this *Meanes*, you may haue (as it seemeth) *Roses* set in the middest of a *Poole*, being supported with some stay; Which is Matter of *Rarenesse* and *Pleasure*, though of small *Vse*. This is the more

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strange, for that the like *Rose-standard* was put, at the same time, into *Water* mixed with *Horse-dung*, the *Horse-dung* about the fourth Part to the *Water*, and in foure Moneths space (while it was obserued) put not forth any *Leafe*, though diuers *Buds* at the first, as the other.

408 A *Dutch Flower*, that had a *Bulbous Root*, was likewise put, at the same time, all vnder *Water*, some two or three Fingers deepe; And within seven daies sprouted, and continued long after, further Growing. There were also put in, a *Beet-Root*, a *Borrage-Root*, and a *Raddish-Root*, which had all their *Leaves* cut almost close to the *Roots*; And within six weekes had faire *Leaves*; And so continued till the end of *November*.

409 Note that if *Roots*, or *Pease*, or *Flowers*, may bee *Accelerated* in their *Comming* and *Ripening*, there is a double Profit; The one in the high *Price* that those Things beare when they come early: The other in the *Swiftnesse* of their *Returns*: For in some Grounds which are strong, you shall haue a *Raddish*, &c. come in a Month; That in other Grounds will not come in two; And so make double *Returns*.

410 *Wheat* also was put into the *Water*, and came not forth at all; So as it seemeth there must be some Strength and Bulke in the Body, put into the *Water*, as it is in *Roots*; For *Graines* or *Seeds*, the Cold of the *Water* will mortifie. But casually some *Wheat* lay vnder the Pan, which was somewhat moistned by the Suing of the Pan; which in six weekes (as aforesaid) looked mouldy to the Eye, but it was sprouted forth halfe a Fingers length.

411 It seemeth by these *Instances* of *Water*, that for Nourishment, the *Water* is almost all in all, and that the *Earth* doth but keepe the *Plant* vp-right, and saue it from *Ouer-heat*, and *Ouer-cold*; And therefore is a Comfortable *Experiment* for good *Drinkers*. It proueth also that our former *Opinion*; That *Drinke* incorporate with *Flesh*, or *Roots*, (as in *Gapon-Beere*, &c.) will nourish more easily, than *Meat* and *Drinke* taken seuerally.

412 The *Housing* of *Plants* (I conceiue) will both *Accelerate Germination*, and bring forth *Flowers* and *Plants* in the *Colder Seasons*: And as wee *House* *Hot-Country Plants*, as *Lemons*, *Orenges*, *Myrtles*, to saue them; So we may *House* our owne *Country Plants*, to forward them, and make them come in the Cold Seasons; In such sort, that you may haue *Violets*, *Strawberries*, *Pease*, all *Winter*: So that you sow, or remove them at fit times. This *Experiment* is to be referred vnto the *Comforting* of the *Spirit* of the *Plant*, by *Warmth*, as well as *Housing* their *Boughs*, &c. So then the *Meanes*, to *Accelerate Germination*, are in Particular eight, in Generall three.

Experiments
in Confort
touching the
Putting backe or
Retardation of
Germination.

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To make *Roses*, or other *Flowers* come late, it is an *Experiment* of Pleasure. For the Ancients esteemed much of *Rosa Sera*. And indeed the *November-Rose* is the sweetest, hauing bin lesse exhiled by the Sunne. The *Meanes* are these. First, the *Cutting off their Tops*, immediately after they haue done Bearing; And then they will come againe the

the same yeare about *November*: But they will not come iust on the Tops, where they were cut, but out of those Shoots, which were, (as it were,) *Water-Boughes*. The *Cause* is, for that the Sap, which otherwise would haue fed the Top, (though after Bearing,) will, by the discharge of that, diuert vnto the Side-Sprouts; And they will come to beare, but later.

The Second is the *Pulling off the Buds of the Rose*, when they are *Newly knotted*; For then the Side-Branches will beare. The *Cause* is the same with the former: For *Cutting off the Tops*, and *Pulling off the Buds*, worke the same Effect, in Retention of the Sap for a time, and Diuersion of it to the Sprouts, that were not so forward.

The Third is the *Cutting off some few of the Top-boughes in the Spring-time*, but suffering the lower Boughes to grow on. The *Cause* is, for that the Boughes doe helpe to draw vp the Sap more strongly; And we see that in Powling of Trees, many doe vse to leaue a Bough or two on the Top, to helpe to draw vp the Sap. And it is reported also, that if you graft vpon the Bough of a Tree, and cut off some of the old Boughes, the new Cions will perish.

The Fourth is by *Laying the Roots bare about Christmas*, some dayes. The *Cause* is plaine, for that it doth arrest the Sappe, from going vpwards, for a time; Which Arrest is afterwards released by the Couering of the Root againe with Earth; And then the Sap getteth vp, but later.

The Fifth is the *Remouing of the Tree*, some Moneth before it *Buddeth*. The *Cause* is, for that some time will be required after the *Remoue*, for the Resetling, before it can draw the Iuyce: And that time being lost, the Blossome must needs come forth later.

The Sixth is the *Grafting of Roses in May*, which commonly Gardiners doe not till *Iuly*; And then they beare not till the Next Yeare; But if you graft them in *May*, they will beare the same yeare, but late.

The Seuen is, the *Girding of the Body of the Tree* about with some Pack-threed; For that also, in a degree, restraineth the Sap, and maketh it come vp, more late, and more Slowly.

The Eighth is, the *Planting of them in a Shade*, or in a *Hedge*; The *Cause* is, partly the Keeping out of the Sunne, which hasteneth the Sap to rise; And partly the Robbing of them of Nourishment, by the Stuffe in the *Hedge*. These Meanes may be practised vpon other, both Trees, and Flowers, *Mutat is Mutandis*.

Men haue entertained a Conceit that sheweth prettily; Namely, that if you graft a *Late-Comming Fruit*, vpon a Stocke of a *Fruit-tree* that *Commeth early*, the Graft will beare *Fruit early*; As a Peach vpon a *Cherrie*; And contrariwise, if an *Early-Comming-Fruit* vpon a Stocke of a *Fruit-Tree* that *Commeth late*, the Graft will beare *Fruit late*; As a *Cherry* vpon a *Peach*. But these are but Imaginations, and vnttrue. The *Cause* is, for that the Cions ouer-ruleth the Stocke quite; And the Stocke is but Passiue only, and giueth Aliment, but no Motion to the Graft.

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Experiments
in Consort,
touching the
Melioration of
Fruits, Trees,
and Plants.

We will speake now, how to make *Fruits, Flowers,* and *Roots* larger; in more plentie; and sweeter; than they vse to be; And how to make the *Trees* themselues, more Tall; more Spread; and more Hastie and Sudden; than they vse to be. Wherein there is no doubt, but the former *Experiments* of *Acceleration*, will serue much to these purposes. And againe, that these *Experiments*, which we shall now set downe, doe serue also for *Acceleration*; because both Effects proceed from the Encrease of Vigour in the Tree; But yet to auoid Confusion; And because some of the Meanes are more proper for the one Effect, and some for the other, we will handle them apart.

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It is an assured Experience, that an *Heape* of *Flint*, or *Stone*, laid about the *Bottom* of a *Wilde-Tree*, (as an *Oake*, *Elme*, *Ash*, &c.) vpon the first Planting, doth make it prosper double as much, as without it. The *Cause* is, for that it retaineth the Moisture, which falleth at any time vpon the *Tree*, and suffereth it not to be exhaled by the *Sunne*. Againe, it keepeth the *Tree* warme, from Cold Blasts and Frosts, as it were in an *House*. It may be also, there is somewhat in the Keeping of it steady at the first. *Quare*, if Laying of Straw some Height about the Bodie of a *Tree*, will not make the *Tree* forwards. For though the Root giueth the Sap, yet it is the Body that draweth it. But you must note, that if you lay *Stones* about the stalke of Lettuce, or other Plants, that are more soft, it will ouer-moisten the Roots, so as the Wormes will eat them.

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A *Tree*, at the first *Setting*, should not be *Shaken*, vntill it hath taken Root fully: And therefore some haue put two little Forkes about the Bottom of their *Trees*, to keepe them vpright; But after a yeares Rooting, then Shaking doth the *Tree* good, by Loosening of the Earth, and (perhaps) by Exercising (as it were) and Stirring the Sap of the *Tree*.

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Generally, the *Cutting away* of *Boughes* and *Suckers* at the *Root* and *Bodie*, doth make *Trees* grow high; And contrariwise, the *Powling* and *Cutting* of the Top, maketh them grow spread, and bushy. As we see in *Pollards*, &c.

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It is reported, that to make *hasty Growing Coppice-Woods*, the way is, to take *Willow*, *Sallow*, *Poplar*, *Alder*, of some seuen yeares growth; And to set them, not vpright, but a-slope, a reasonable depth vnder the Ground; And then, in stead of one Root, they will put forth many, and so carry more Shoots vpon a Stemme.

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When you would haue many new *Roots* of *Fruit-trees*, take a *Low Tree*, and bow it, and lay all his Branches a-flat vpon the Ground, and cast Earth vpon them; And euery Twigge will take Root. And this is a very profitable *Experiment* for *Costly Trees*; (for the *Boughes* will make *Stockes*

Stockes without charge;) Such as are *Apricots, Peaches, Almonds, Cornelians, Mulberries, Figs, &c.* The like is continually practised with *Vines, Roses, Muske-Roses, &c.*

From *May* to *Iuly* you may take off the *Barke* of any *Bough*, being of the Bignesse of three or foure Inches, and couer the bare Place, somewhat aboue, and below, with Loame well tempered with Horse-dung, binding it fast downe. Then cut off the *Bough* about *Alhollontide* in the bare place, and set it in the Ground; And it will grow to be a faire *Tree* in one Year. The *Cause* may be, for that the *Baring* from the *Barke* keepeth the *Sap* from descending towards Winter, and so holdeth it in the *Bough*; And it may be also that the Loame and Horse-Dung applied to the bare place, doe moisten it, and cherish it, and make it more apt to put forth the Root. Note, that this may be a generall Meanes for keeping vp the *Sap* of *Trees* in their *Boughes*; Which may serue to other Effects.

It hath beene practised in *Trees*, that shew faire, and beare not, to Bore a *Hole* thorow the *Heart* of the *Tree*, and thereupon it will beare. Which may be for that the *Tree* before had too much *Repletion*, and was oppressed with his owne *Sappe*; For *Repletion* is an *Enemie* to *Generation*.

It hath beene practised in *Trees*, that doe not beare, to cleaue two or three of the *Chiefe* Roots, and to put into the *Cleft* a small *Pebble*, which may keepe it open, and then it will beare. The *Cause* may be, for that a *Root* of a *Tree* may be (as it were,) *Hide-bound*, no lesse than the *Body* of the *Tree*; But it will not keepe open without somewhat put into it.

It is vsually practised, to set *Trees* that require much *Sunne*, vpon *Walls* against the *South*; As *Apricots, Peaches, Plums, Vines, Figs*, and the like. It hath a double *Commoditie*; The one, the *Heat* of the *Wall* by *Reflexion*; The other, the *Taking away* of the *Shade*; For when a *Tree* groweth round, the vpper *Boughes* ouer-shadow the lower; But when it is spread vpon a *Wall*, the *Sunne* commeth alike, vpon the vpper, and lower *Branches*.

It hath also beene practised (by some) to pull off some *Leaves* from the *Trees* so spread, that the *Sunne* may come vpon the *Bough* and *Fruit* the better. There hath beene practised also a *Curiositie*, to set a *Tree* vpon the *North-Side* of a *Wall*, and at a little height, to draw him thorow the *Wall*, and spread him vpon the *South-Side*: Conceiuing that the *Root* and lower Part of the *Stocke* should enioy the *Freshnesse* of the *Shade*; And the Vpper *Boughes*, and *Fruit*, the *Comfort* of the *Sunne*. But it sorted not; The *Cause* is, for that the *Root* requireth some *Comfort* from the *Sunne*, though vnder *Earth*, as well as the *Body*: And the Lower Part of the *Body* more than the Vpper, as wee see in *Compassing* a *Tree* below with *Straw*.

The *Lownesse* of the *Bough*, where the *Fruit* commeth, maketh the *Fruit* greater, and to ripen better; For you shall euer see in *Apricots, Peaches,*

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Peaches, or *Melo-Cotones*, vpon a wall, the greatest Fruits towards the Bottom. And in *France* the *Grapes* that make the *Wine*, grow vpon low Vines, bound to small Stakes. And the raised Vines in Arbours make but Veriuyce. It is true, that in *Italy*, and other *Countries*, where they haue hotter Sunne, they raise them vpon *Elmes*, and Trees; But I conceiue, that if the *French* Manner of Planting low, were brought in vse there, their *Wines* would be stronger and sweeter. But it is more chargeable in respect of the Props. It were good to trie whether a *Tree* grafted somewhat neare the Ground, and the lower boughes only maintained, and the higher continually pruned off, would not make a larger *Fruit*.

433 To haue *Fruit* in Greater Plentie, the way is, to graft, not onely vpon young *Stocks*, but vpon diuers *Boughes* of an old *Tree*; for they will beare great Numbers of *Fruit*; Whereas if you graft but vpon one *Stocke*, the *Tree* can beare but few.

434 The Digging yearly about the *Roots* of *Trees*, which is a great means, both to the Acceleration and Melioration of *Fruits*, is practised in nothing but in *Vines*; Which if it were transferred vnto other *Trees*, and *Shrubs*, (as *Roses*, &c.) I conceiue would aduance them likewise.

435 It hath beene knowne, that a *Fruit-Tree* hath beene blowne vp (almost) by the *Roots*, and set vp againe, and the next yeare bare exceedingly. The Cause of this, was nothing but the Loosening of the *Earth*, which comforteth any *Tree*, and is fit to be practised, more than it is, in *Fruit-Trees*: For *Trees* cannot be so fitly remoued into New Grounds, as *Flowers* and *Herbs* may.

436 To reuiue an *Old Tree*, the Digging of it about the *Roots*, and Applying new Mould to the *Roots*, is the way. We see also that *Draught-Oxen*, put into fresh Pasture, gather new and tender *Flesh*; And in all Things, better nourishment than hath beene vsed, doth helpe to renew; Especially, if it be not onely better, but changed, and differing from the former.

437 If an *Herbe* be cut off from the *Roots*, in the beginning of Winter, and then the *Earth* be troden and beaten downe hard, with the Foot and Spade, the *Roots* will become of very great Magnitude in Summer. The Reason is, for that the Moisture being forbidden to come vp in the Plant, stayeth longer in the Root, and so dilateth it. And *Gardiners* vse to tread downe any loose Ground, after they haue sowne *Onions*, or *Turnips*, &c.

438 If *Panicum* be laid below, and about the Bottom of a *Root*, it will cause the Root to grow to an Excessiue Bignesse. The Cause is, for that being it selfe of a Spungy Substance, it draweth the Moisture of the *Earth* to it, and so feedeth the Root. This is of greatest vse for *Onions*, *Turnips*, *Parfnips*, and *Carrets*.

439 The Shifting of Ground is a Meanes to better the *Tree*, and *Fruit*; But with this Caution; That all Things doe prosper best, when they are aduanced to the better: Your *Nursery* of *Stockes* ought to be in a more Barren

Barren Ground, than the Ground is whereunto you remove them. So all *Grassiers* preferre their Cattell from meaner Pastures to better. We see also, that Hardnesse in Youth lengthneth Life, because it lea- ueth a Cherishing to the better of the Bodie, in Age: Nay in Exer- cises, it is good to beginne with the hardest, as Dancing in Thicke Shooes, &c.

It hath beene obserued, that *Hacking* of *Trees* in their *Barke*, both downe-right, and acrosse, so as you make them rather in slices, than in continued Hacks, doth great good to *Trees*; And especially deliuereth them from being *Hide-bound*, and killeth their *Mosse*.

Shade to some *Plants* conduceth to make them large, and prospere- ous, more than *Sunne*; As in *Straw-berries*, and *Bayes*, &c. Therefore amongst *Strawberries*, sow here and there some *Borage-Seed*; And you shall finde the *Strawberries* vnder those *Leaues* farre more large than their *Fellowes*. And *Bayes* you must plant to the *North*; Or defend them from the *Sunne* by a *Hedge-Row*; And when you sow the *Ber- ries*, weed not the *Borders*, for the first halfe yeare; For the *Weed* giueth them *Shade*.

To increase the *Crops* of *Plants*, there would be considered, not only the *Increasing* the *Lust* of the *Earth*, or of the *Plant*, but the sauing also of that which is spilt. So they haue lately made a *Triall*, to *See Wheat*; which neuerthelesse hath beene left off, because of the trouble and paines; Yet so much is true, that there is much saued by the *Setting*, in comparison of that which is *Sown*; Both by keeping it from being picked vp by *Birds*; And by Auoiding the *Shallow* lying of it, whereby much that is sown taketh no *Root*.

It is prescribed by some of the *Ancients*, that you take *Small Trees*, vp- on which *Figs* or other *Fruit* grow, being yet vnripe, and couer the *Trees* in the Middle of *Autumne* with dung, vntill the *Spring*; And then take them vp in a warme day, and replant them in good Ground; And by that meanes, the former yeares *Tree* will be ripe, as by a new Birth; when other *Trees* of the same kind, doe but blossome. But this seemeth to haue no great *Probability*.

It is reported, that if you take *Nitre*, and mingle it with *Water*, to the thicknesse of *Honey*, and therewith annoint the *Bud*, after the *Vine* is cut, it will sprout forth within eight dayes. The *Cause* is like to be, (if the *Experiment* be true,) the Opening of the *Bud*, and of the Parts Conti- guous, by the Spirit of the *Nitre*; For *Nitre* is (as it were) the Life of *Vegetables*.

Take *Seed*, or *Kernells* of *Apples*, *Peares*, *Oranges*; Or a *Peach*, or a *Plum-Stone*, &c. And put them into a *Squill*, (which is like a great *Onion*,) and they will come vp much earlier than in the *Earth* it selfe. This I conceiue to be as a *Kinde* of *Grafting* in the *Root*; For as the *Stocke* of a *Graft* yeeldeth better prepared *Nourishment* to the *Graft*, than the *Crude Earth*; So the *Squill* doth the like to the *Seed*. And I suppose the same would be done, by Putting *Kernells* into a *Turnip*, or the

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the like; Saue that the *Squill* is more Vigorous, and Hot. It may be tried also, with putting *Onion-Seed* into an *Onion-Head*, which thereby (perhaps) will bring forth a larger, and earlier *Onion*.

446 The *Pricking* of a *Fruit* in severall places, when it is almost at his Bignesse, and before it ripeneth, hath beene practised with success; to ripen the *Fruit* more suddenly. Wee see the Example of the *Biting* of *Wasps*, or *Wormes*, vpon *Fruit*, whereby it (manifestly) ripeneth the sooner.

447 It is reported, that *Alga Marina* (*Sea-weed*) put vnder the *Roots* of *Cole-worts*, and (perhaps) of other *Plants*, will further their Growth. The vertue (no doubt) hath Relation to *Salt*, which is a great Helpe to Fertility.

448 It hath beene practised, to cut off the *Stalkes* of *Cucumbers*, immediately after their *Bearing*, close by the Earth; And then to cast a prettie Quantitie of Earth vpon the *Plant* that remaineth; and they will beare the next yeare *Fruit*, long before the ordinary time. The Cause may be, for that the Sap goeth downe the sooner, and is not spent in the *Stalke* or *Leafe*, which remaineth after the *Fruit*. Where note, that the *Dying*, in the Winter, of the *Roots* of *Plants*, that are *Annvall*, seemeth to be partly caused by the Ouer-Expende of the Sap into *Stalke*, and *Leaves*; which being preuented, they will super-annate, if they stand warme.

449 The *Pulling off* many of the *Blossomes* from a *Fruit-Tree*, doth make the *Fruit* fairer. The Cause is manifest; For that the Sap hath the lesse to nourish. And it is a Common Experience, that if you doe not pull off some *Blossomes*, the first time a *Tree* bloometh, it will blossome it selfe to death.

450 It were good to try, what would be the Effect, if all the *Blossomes* were pulled from a *Fruit-Tree*; Or the *Acornes* and *Chestnut-buds*, &c. from a *Wilde Tree*, for two yeares together. I suppose that the *Tree* will either put forth, the third yeare, bigger, and more plentifull *Fruit*; Or else, the same yeares, larger *Leaves*, because of the Sap stored vp.

451 It hath beene generally receiued, that a *Plant watered* with *Warme Water*, will come vp sooner and better, than with *Cold Water*, or with *Showers*. But our Experiment of *Watering Wheat* with *Warme Water* (as hath beene said) succeeded not; which may be, because the Triall was too late in the Yeare, viz. in the End of *October*. For the Cold then comming vpon the *Seed*, after it was made more tender by the *Warme Water*, might checke it.

452 There is no doubt, but that *Grafting* (for the most Part) doth meliorate the *Fruit*. The Cause is manifest; For that the Nourishment is better prepared in the *Stocke*, than in the *Crude Earth*: But yet note well, that there be some *Trees*, that are said to come vp more happily from the *Kernell*, than from the *Graft*; As the *Peach*, and *Melocotone*. The Cause I suppose to be, for that those *Plants* require a Nourishment of great Moisture; And though the Nourishment of the *Stocke* be finer, and

and better prepared, yet it is not so moist, and plentifull, as the Nourishment of the *Earth*. And indeed we see those *Fruits* are very Cold *Fruits* in their Nature.

It hath beene receiued, that a Smaller *Peare*, grafted vpon a *Stocke* that beareth a greater *Peare*, will become Great. But I thinke it is as true, as that of the *Prime-Fruit* vpon the *Late Stocke*; And *e conuerso*; which we reiected before: For the *Cions* will gouerne. Neuerthelesse it is probable enough, that if you can get a *Cions* to grow vpon a *Stock* of another kinde, that is much moister than his owne *Stocke*, it may make the *Fruit* Greater, because it will yeeld more plentifull nourishment; Though it is like it will make the *Fruit* Baser. But generally, the *Grafting* is vpon a dryer *Stock*; As the *Apple* vpon a *Crab*; The *Peare* vpon a *Thorne*; &c. Yet it is reported, that in the *Low-Countries* they will graft an *Apple-Cions* vpon the *Stocke* of a *Colewort*, and it will beare a great flaggy *Apple*; The *Kernell* of which, if it be set, will be a *Colewort*, and not an *Apple*. It were good to try, whether an *Apple-Cions* will prosper, if it be grafted vpon a *Sallow*, or vpon a *Poplar*, or vpon an *Alder*, or vpon an *Elme*, or vpon an *Horse-Plumme*, which are the moistest of *Trees*. I haue heard that it hath beene tried vpon an *Elme*, and succeeded.

It is manifest by Experience, that *Flowers* Remoued wax greater, because the Nourishment is more easily come by, in the loose *Earth*. It may be, that Oft Regrafting of the same *Cions*, may likewise make *Fruit* greater; As if you take a *Cions*, and graft it vpon a *Stocke* the first yeere; And then cut it off, and graft it vpon another *Stocke* the second yeere; and so for a third; Or fourth yeere; And then let it rest, it will yeeld afterward, when it beareth, the greater *Fruit*.

Of Grafting there are many Experiments worth the Noting, but those we reserue to a proper Place.

It maketh *Figs* better, if a *Fig-Tree*, when it beginneth to put forth Leaues, haue his Top cut off. The cause is plaine, for that the Sap hath the lesse to feed, and the lesse way to mount: But it may be, the *Fig* will come somewhat later, as was formerly touched. The same may be tried likewise in other *Trees*.

It is reported, that *Mulberries* will bee fairer, and the *Trees* more fruitfull, if you bore the *Truncke* of the *Tree* thorow, in seuerall places, and thrust into the Places bored, Wedges of some Hot *Trees*, as *Turpentine*, *Mastick-Tree*, *Guaiacum*, *Iuniper*, &c. The Cause may be, for that Aduentiue Heat doth cheare vp the Native Iuyce of the *Tree*.

It is reported, that *Trees* will grow greater, and beare better *Fruit*, if you put *Salt*, or *Lees* of *Wine*, or *Bloud* to the *Root*. The Cause may be the Encreasing the Lust or Spirit of the *Root*; These Things being more forcible, than ordinary *Composts*.

It is reported by one of the Ancients, that *Artichoakes* will be lesse prickly, and more tender, if the *Seeds* haue their Tops dulled, or grated off vpon a *Stone*.

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Herbs will be tenderer, and fairer; if you take them out of *Beds*, when they are newly come vp, and remoue them into *Pots*, with better *Earth*. The Remoue from *Bed* to *Bed* was spoken of before; But that was in seuerall yeeres; This is vpon the sudden. The *Cause* is the same with other *Remones*, formerly mentioned.

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Coleworts are reported by one of the *Ancients*, to prosper exceedingly, and to be better tasted, if they be sometimes watred with *Salt-water*; And much more with *Water* mixed with *Nitre*; The Spirit of which is lesse Adurent than *Salt*.

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It is reported that *Cucumbers* will proue more Tender, and Dainty, if their *Seeds* be *Steeped* (a little) in *Milke*; The *Cause* may be, for that the *Seed* being mollified with the *Milke*, will be too weake to draw the grosser Iuyce of the *Earth*, but onely the finer. The same *Experiment* may be made in *Artichoakes*, and other *Seeds*, when you would take away, either their *Flashinesse*, or *Bitternesse*. They speake also, that the like Effect followeth, of *Steeping* in *Water* mixed with *Honey*; But that seemeth to me not so probable, because *Honey* hath too quicke a Spirit.

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It is reported that *Cucumbers* will be lesse Watry, and more Melon-like, if in the Pit where you set them, you fill it (halfe way vp) with *Chaffe*, or small *Sticks*, and then powre *Earth* vpon them; For *Cucumbers*, as it seemeth, doe extremely affect Moisture; And ouer-drinke themselues; Which this *Chaffe*, or *Chips*, forbiddeth. Nay, it is further reported, that if when a *Cucumber* is growne, you set a Pot of water about fise or six inches distance from it, it will, in 24. houres, shoot so much out, as to touch the Pot; Which if it be true, it is an *Experiment* of an higher Nature, than belongeth to this *Title*: For it discovereth *Perception* in *Plants*, to moue towards that which should helpe and comfort them, though it be at a distance. The ancient Tradition of the *Vine* is far more strange: It is, that if you set a Stake, or Prop, some distance from it, it will grow that way; Which is farre stranger (as is said) than the other; For that *Water* may work by a *Sympathy* of *Attraction*: But this of the *Stake* seemeth to be a Reasonable Discourse.

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It hath beene touched before, that *Terebration* of *Trees* doth make them prosper better. But it is found also, that it maketh the *Fruit* sweeter, and better. The *Cause* is, for that notwithstanding the *Terebration*, they may receiue Aliment sufficient; And yet no more than they can well turne, and digest; And withall doe sweat out the coursest and vnprofitablest Iuyce; Euen as it is in *Living Creatures*, which by Moderate Feeding, and Exercise, and Sweat, attaine the soundest Habit of Body.

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As *Terebration* doth *Meliorate Fruit*, so, vpon the like reason, doth Letting of *Plants* Bloud; As *Pricking Vines*, or other *Trees*, after they bee of some Growth; And thereby letting forth *Gum*, or *Tearcs*; Though this be not to continue, as it is in *Terebration*, but at some Seasons. And it is reported, that by this Artifice, *Bitter Almonds* haue beene turned into *Sweet*.

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The Ancients for the *Dalcorating* of *Fruit*, doe commend *Swines-Dung* aboue all other *Dung*; Which may be, because of the Moisture of that Beast, whereby the *Excrement* hath lesse Acrimony; For we see *Swines* and *Piggs* Flesh is the Moistest of Fleshes.

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It is obserued by some, that all *Herbs* wax sweeter, both in Smell and Taste, if after they be growne vp some reasonable time, they be cut, and so you take the latter Sprout. The Cause may be, for that the longer the Iuyce stayeth in the Roor, and Stalke, the better it concocteth. For one of the Chiefe Causes, why *Grains*, *Seeds*, and *Fruits*, are more Nourishing than *Leaues*, is the Length of time, in which they grow to *Maturation*. It were not amisse to keepe backe the Sap of *Herbs*, or the like, by some fit meanes, till the end of Summer; whereby (it may be) they will be more Nourishing.

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As *Grafting* doth generally aduance and *Meliorate Fruits*, aboue that which they would bee, if they were set of *Kernels*, or *Stones*, in regard the *Nourishment* is better concocted; So (no doubt) euen in *Grafting*, for the same cause the Choise of the *Stocke* doth much; Alwaies provided, that it be somewhat inferiour to the *Cions*: For otherwise it dul- leth it. They commend much the *Grafting* of *Peares*, or *Apples*, vpon a *Quince*.

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Besides the *Meanes* of *Melioration* of *Fruits*, before mentioned, it is set downe as tryed, that a *Mixture* of *Bran*, and *Swines-Dung*; Or *Chaffe* and *Swines-Dung*; (especially laid vp together for a Moneth to rot,) is a very great Nourisher, and Comforter to a *Fruit-Tree*.

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It is deliuered, that *Onions* wax greater, if they be taken out of the Earth, and laid a drying twenty daies, and then set againe; And yet more, if the outermost Pill be taken off all ouer.

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It is deliuered by some, that if one take the *Bough* of a *Low Fruit-Tree*, newly budded, and draw it gently, without hurting it, into an *Earthen Pot* perforate at the bottome to let in the *Plant*, and then Couer the *Pot* with Earth, it will yeeld a very large *Fruit*, within the Ground. Which *Experiment* is Nothing but *Potting* of *Plants*, without Remouing, and Leauing the *Fruit* in the Earth. The like, (they say,) will be effected, by an *Empty Pot* without Earth in it, put ouer a *Fruit*, being propped vp with a *Stake*, as it hangeth vpon the *Tree*; And the better, if some few Pertusions be made in the *Pot*. Wherein, besides the Defending of the *Fruit*, from Extremity of Sunne or Weather, some giue a reason, that the *Fruit*, Louing and Coueting the open Aire and Sunne, is iouired by those Pertusions, to spread and approach, as neere the open Aire, as it can; And so enlargeth in *Magnitude*.

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All *Trees* in *High* and *Sandy Grounds*, are to be set deepe; And in *Watry Grounds*, more shallow. And in all *Trees*, when they be remoued (especially *Fruit-Trees*) care ought to be taken, that the Sides of the *Trees* be coasted, (*North* and *South*, &c.) as they stood before. The same is said also of *Stone* out of the *Quarry*, to make it more durable; Though that

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seemeth to haue lesse reason; Because the *Stone* lyeth not so neere the *Sunne*, as the *Tree* groweth.

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Timber Trees in a *Coppice Wood*, doe grow better, than in an *Open Field*; Both because, they offer not to spread so much, but shoot vp still in Height; And chiefly because they are defended from too much Sun and Wind, which doe checke the Growth of all *Fruit*; And so (no doubt) *Fruit-Trees*, or *Vines*, set vpon a *Wall*, against the *Sunne*, betweene Elbowes or Buttresses of *Stone*, ripen more, than vpon a *Plaine Wall*.

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It is said, that if *Potado Roots*, be set in a *Pot* filled with *Earth*, and then the *Pot* with *Earth* be set likewise within the *Gound*, some two or three Inches, the *Roots* will grow greater, than Ordinary. The Cause may be, for that Hauing *Earth* enough within the *Pot* to nourish them; And then being stopped by the *Bottom* of the *Pot* from putting Strings downward, they must needs grow greater in Breadth and Thickness. And it may be, that all *Seeds*, or *Roots*, Potted, and so set into the *Earth*, will prosper the better.

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The Cutting off the *Leaues* of *Radish*, or other *Roots*, in the beginning of *Winter*, before they wither; And Couering againe the *Root*, something high with *Earth*; Will preserue the *Root* all *Winter*, and make it bigger, in the *Spring* following, as hath beene partly touched before. So that there is a double Vse of this Cutting off the *Leaues*: For in *Plants*, where the *Root* is the *Esculent*, as *Radish*, and *Parsnips*, it will make the *Root* the greater: And so it will doe to the *Heads* of *Onions*. And where the *Fruit* is the *Esculent*, by Strengthening the *Root*, it will make the *Fruit* also the greater.

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It is an *Experiment* of great pleasure, to make the *Leaues* of *Shady Trees*, larger than ordinary. It hath beene tried (for certaine) that a *Cions* of a *Weech-Elme*, grafted vpon the *Stock* of an Ordinary *Elme*, will put forth *Leaues*, almost as broad as the *Brimme* of ones *Hat*. And it is very likely, that as in *Fruit-Trees*, the *Graft* maketh a greater *Fruit*; So in *Trees* that beare no *Fruit*, it will make the greater *Leaues*. It would be tryed therefore in *Trees* of that kinde chiefly; As *Birch*, *Asp*, *Willow*; And especially the *Shining Willow*, which they call *Swallow-Taile*, because of the pleasure of the *Leafe*.

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The *Barrenesse* of *Trees*, by *Accident*, (besides the *Weaknesse* of the *Soile*, *Seed*, or *Root*; And the *Iniury* of the *Weather*) commeth either of their *Ouer-growing* with *Mosse*; Or their being *Hide-bound*; Or their *Planting too deepe*; Or by *Issuing* of the *Sap too much into the Leaues*. For all these there are *Remedies* mentioned before.

Experiments
in Consort,
touching Com-
pound Fruits
and Flowers.

Wee see that in *Liuing Creatures*, that haue *Male* and *Female*, there is *Copulation* of seuerall Kinds; And so *Compound Creatures*; As the *Mule*, that is generated betwixt the *Horse* and the *Asse*; And some other *Compounds*, which we call *Monsters*,

sters, though more rare : And it is held, that that *Prouerbe*, *Africa semper aliquid Monstri parit*; commeth, for that the Fountaines of Waters there, being rare, diuers sorts of Beasts come from seuerall Parts to drinke; And so being refreshed, fall to couple, and many times with seuerall Kinds. The *Compounding* or *Mixture* of *Kinds* in *Plants* is not found out; Which neuerthelesse, if it be possible, is more at command, than that of *living Creatures*; For that their Lust requireth a voluntary Motion: wherefore it were One of the most Noble *Experiments* touching *Plants*, to finde it out: For so you may haue great Variety of New *Fruits*, and *Flowers* yet vknowne. *Grafting* doth it not: That mendeth the *Fruit*, or doubleth the *Flowers*, &c. But it hath not the Power to make a New *Kinde*. For the *Cions* euer ouer-ruleth the *Stocke*.

It hath beene set downe by one of the *Ancients*, that if you take two *Twigs* of seuerall *Fruit Trees*, and flat them on the Sides, and then binde them close together, and set them in the ground, they will come vp in one *Stocke*; But yet they will put forth their seuerall *Fruits*, without any *Commixture* in the *Fruit*. Wherein note (by the way) that *Vnity* of *Continuance*, is easier to procure, than *Vnity* of *Species*. It is reported also, that *Vines* of *Red* and *White Grapes*, being set in the Ground, and the vpper Parts being flatted, and bound close together, will put forth *Grapes* of the seuerall Colours, vpon the same Branch; And *Grape Stones* of seuerall Colours within the same *Grape*: But the more, after a yeere or two; The *Vnity* (as it seemeth) growing more Perfect. And this will likewise helpe, if from the first *Vniting*, they be often *Watred*; For all Moisture helpeth to *Vnion*. And it is prescribed also, to binde the *Bud*, as soone as it commeth forth, as well as the *Stocke*; At the least for a time.

They report, that diuers *Seeds*, put into a *Clout*, and laid in Earth well dunged, will put vp *Plants* *Contiguous*; Which (afterwards) being bound in, their *Shoots* will *Incorporate*. The like is said of *Kernels*, put into a *Bottle*, with a Narrow Mouth, filled with Earth.

It is reported, that young *Trees* of seuerall kinds, set contiguous, without any binding, and very often *Watred*, in a *Fruitfull Ground*, with the very Luxury of the *Trees*, will incorporate, and grow together. Which seemeth to me the likeliest Meanes, that hath beene propounded; For that the *Binding* doth hinder the Naturall Swelling of the *Tree*; which, while it is in Motion, doth better *vnite*.

There are many Ancient and Receiued Traditions, and Obseruations, touching the *Sympathy* and *Antipathy* of *Plants*:

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For

Experiments
in Consort
touching the
Sympathy and
Antipathy of
Plants.

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For that some will thrive best growing neere others; which they impute to *Sympathy*: And some worse; which they impute to *Antipathy*. But these are Idle and Ignorant Conceits; And forsake the true *Indication* of the *Causes*; As the most Part of *Experiments*, that concerne *Sympathies* and *Antipathies* doe. For as to *Plants*, neither is there any such Secret *Friendship*, or *Hatred*, as they imagine; And if we should bee content to call it *Sympathy*, and *Antipathy*, it is vriterly mistaken; For their *Sympathy* is an *Antipathy*, and their *Antipathy* is a *Sympathy*: For it is thus; Wheresoever one *Plant* draweth such a particular Iuyce out of the Earth; as it qualifieth the Earth; So as that Iuyce which remaineth is fit for the other *Plant*, there the Neighbourhood doth good; Because the Nourishments are contrary, or seuerall: But where two *Plants* draw (much) the same Iuyce, there the Neighbourhood hurteth; For the one deceiueth the other.

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First therefore, all *Plants* that doe draw much *Nourishment* from the *Earth*, and so soake the Earth, and exhaust it; hurt all Things that grow by them; As *Great Trees*, (especially *Asbes*) and such *Trees*, as spread their *Roots*, neere the Top of the Ground. So the *Colewort* is not an Enemy (though that were anciently receiued) to the *Vine* onely; But it is an Enemy to any other *Plant*; Because it draweth strongly the fattest Iuyce of the Earth. And if it be true, that the *Vine*, when it creepeth neere the *Colewort*, will turne away; This may be, because there it findeth worse Nourishment; For though the *Root* be where it was, yet (I doubt) the *Plant* will bend as it nourisheth.

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Where *Plants* are of seuerall Natures, and draw seuerall Iuyces out of the Earth, there (as hath beene said) the One set by the other helpeth: As it is set downe by diuers of the Ancients, that *Rew* doth prosper much, and becommeth stronger, if it be set by a *Figge-Tree*: which (we conceiue) is caused, Not by Reason of *Friendship*, but by *Extraction* of a Contrary Iuyce: The one Drawing Iuyce fit to result Sweet, the other bitter. So they haue set downe likewise, that a *Rose* set by *Garlicke* is sweeter: Which likewise may be, because the more Fetide Iuyce of the Earth goeth into the *Garlick*; And the more Odorate into the *Rose*.

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This wee see manifestly, that there be certaine *Corne-Flowers*, which come seldome or neuer in other places, vnlesse they bee set; But onely amongst *Corne*: As the *Blew-Bottle*, a kinde of *Yellow Mary-Gold*, *Wilde Poppy*, and *Fumitory*. Neither can this bee, by Reason of the Culture of the Ground, by Plowing, or Furrowing; As some *Herbs*, and *Flowers*, will grow but in *Ditches* new Cast; For if the *Ground* lie fallow, and vsowne, they will not come: So as it should seeme to be the *Corne*, that

that qualifieth the Earth, and prepareth it for their Growth.

This Obseruation, if it holdeth, (as it is very probable,) is of great vse, for the *Meliorating of Taste in Fruits, and Esculent Herbs*; And of the *Sent of Flowers*. For I doe not doubt, but if the *Figge-Tree* doe make the *Rew* more strong, and bitter, (as the Ancients haue noted,) good store of *Rew* planted about the *Fig-Tree*, will make the *Fig* more sweet. Now the *Tastes* that doe most offend in *Fruits, and Herbs, and Roots*, are *Bitter, Harriſh; Sowre; And Watrish, or Flasby*. It were good therefore to make the *Trialls* following.

Take *Wormewood, or Rew*, and set it neere *Lettuce, or Coleſlory, or Artichoake*; And see whether the *Lettuce, or the Coleſlory, &c.* become not the sweeter.

Take a *Seruiſe-Tree, or a Cornelian-Tree, or an Elder-Tree*, which wee know haue *Fruits* of harsh and binding Iuyce, and set them neare a *Vine, or Figge-Tree*, and see whether the *Grapes, or Figges*, will not be the sweeter.

Take *Cucumbers, or Pumpions*, and set them (here and there) amongst *Muske-Melons*, and see whether the *Melons* will not be more Winy, and better tasted. Set *Cucumbers* (likewise) amongst *Radish*, and see whether the *Radish* will not be made the more Biting.

Take *Sorrell*, and set it amongst *Raspes*, and see whether the *Rasps* will not be the sweeter.

Take *Common Briar*, and set it amongst *Violets, or Wall-Flowers*, and see whether it will not make the *Violets, or Wall-Flowers* sweeter, and lesse Earthy in their Smell. So set *Lettuce, or Cucumbers*, amongst *Rosemary, or Bayes*, and see whether the *Rosemary, or Bayes*, will not be the more Odorate, or Aromaticall.

Contrariwise, you must take heed, how you set *Herbs* together, that draw much the like Iuyce. And therefore I thinke *Rosemary* will leese in Sweetnesse, if it be set with *Lauender, or Bayes, or the like*. But yer, if you will correct the strength of an Herbe, you shall doe well to set other like Herbs by him, to take him downe; As if you should set *Tansy* by *Angelica*, it may be, the *Angelica* would be the weaker, and fitter for Mixture in Perfume. And if you should set *Rew* by *Common Wormewood*, it may be, the *Wormewood* would turne to be liker *Roman Wormewood*.

This *Axiome* is of large extent; And therefore would be seuered, and refined by *Triall*. Neither must you expect to haue a *Grosse Difference* by this kinde of Culture, but only *Further Perfection*.

Triall would be also made in *Herbs Poisonous, and Purgatiue*, whose ill Qualitie (perhaps) may be discharged, or attempted, by Setting stronger *Poisons, or Purgatiues*, by them.

It is reported, that the *Shrub* called *Our Ladies Seale*, (which is a Kinde of *Briony*;) and *Coleworts*, set neere together, one or both will die. The *Cause* is, for that they be both great Depredatours of the Earth, and one of them starueth the other. The like is said of a *Reed*, and a *Brake*; Both which are succulent; And therefore the One de-
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ceiueth the Other. And the like of *Hemlocke* and *Rew*; Both which draw strong Iuyces.

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Some of the Ancients, and likewise diuers of the Moderne Writers, that haue laboured in *Naturall Magick*, haue noted a *Sympathy*, betweene the *Sunne*, *Moone*, and some Principall *Starres*; And certaine *Herbs*, and *Plants*. And so they haue denominated some *Herbes Solar*, and some *Lunar*; And such like Toyes put into great Words. It is manifest, that there are some *Flowers*, that haue *Respect* to the *Sunne*, in two *Kindes*; The one by *Opening* and *Shutting*; And the other by *Bowing* and *Inclining* the *Head*. For *Mary-golds*, *Tulippa's*, *Pimpernell*, and indeed most *Flowers*, doe open or spread their *Leaues* abroad, when the *Sunne* shineth serene and faire: And againe, (in some part,) close them, or gather them inward, either towards Night, or when the *Skie* is ouercast. Of this there needeth no such Solemne Reason to be assigned; As to say, that they reioyce at the Presence of the *Sunne*; And mourne at the Absence thereof. For it is Nothing else, but a little Loading of the *Leaues*, and Swelling them at the *Bottom*, with the *Moisture* of the *Aire*; whereas the drie *Aire* doth extend them: And they make it a Peece of the wonder, that *Garden Clauer* will hide the *Stalke*, when the *Sunne* sheweth bright; Which is Nothing, but a full Expansion of the leaues. For the *Bowing* and *Inclining* the *Head*; it is found in the great *Flower* of the *Sunne*; in *Mary-golds*; *Wart-wort*; *Mallow Flowers*; and others. The *Cause* is somewhat more Obscure than the former; But I take it to be no other, but that the Part against which the *Sunne* beareth, waxeth more faint and flaccide in the *Stalke*; And thereby lesse able to support the *Flower*.

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What a little *Moisture* will doe in *Vegetables*, euen though they be dead, and seuered from the *Earth*, appeareth well in the *Experiment* of *Inglers*. They take the *Beard* of an *Oate*; which (if you marke it well,) is wreathed at the *Bottom*, and one smooth entire *Straw* at the *Top*. They take only the Part that is Wreathed, and cut off the other, leauing the *Beard* halfe the Breadth of a finger in length. Then they make a little *Crosse* of a *Quill*, long-wayes of that Part of the *Quill*, which hath the *Pith*; And *Crosse-wayes* of that peece of the *Quill* without *Pith*; The whole *Crosse* being the Breadth of a Finger high. Then they pricke the *Bottom* where the *Pith* is, and thereinto they put the *Oaten-beard*, leauing halfe of it sticking forth of the *Quill*: Then they take a little white Box of wood, to deceiue Men, as if somewhat in the Box did worke the Feat: In which, with a Pinne, they make a little Hole, enough to take the *Beard*, but not to let the *Crosse* sinke downe, but to sticke. Then likewise by way of *Imposture*, they make a *Question*; As, Who is the Fairest Woman in the Company? Or, Who hath a Gloue, or Card? And cause another to name diuers Persons: And vpon euery Naming, they sticke the *Crosse* in the Box, hauing first put it towards their Mouth, as if they charmed it; And the *Crosse* stirreth not; But when they come to the Person that they would take; As they hold the *Crosse* to their mouth, they

they touch the *Beard* with the Tip of their Tongue, and wet it; And so sticke the *Crosse* in the Box; And then you shall see it turne finely and softly, three or foure Turnes; Which is caused by the vntwining of the *Beard* by the Moisture. You may see it more euidently, if you itick the *Crosse* betweene your fingers, in Stead of the Box; And therefore you may see, that this Motion, which is effected by so little Wet, is stronger than the Closing or Bending of the Head of a *Marigold*.

It is reported by some, that the *Herbe* called *Rosa-Solis*, (whereof they make Strong Waters,) will at the Noone-day, when the *Sunne* shineth hot and bright, haue a great Dew vpon it. And therefore, that the right Name is *Ros Solis*: which they impute to a Delight and *Sympathy*, that it hath with the *Sunne*. Men fauour Wonders. It were good first to be sure, that the Dew that is found vpon it, be not the Dew of the Morning Preserued, when the Dew of other *Herbs* is breathed away; for it hath a smooth and thicke Lease, that doth not discharge the Dew so soone, as other *Herbes* that are more Spungie and Porous. And it may be *Purslane*, or some other *Herbe*, doth the like, and is not marked. But if it be so, that it hath more Dew at Noone, than in the Morning, then sure it seemeth to be an Exudation of the *Herbe* it selfe. As Plums sweate when they are set into the Ouen: for you will not (I hope) thinke, that it is like *Gedeons Fleece of Wooll*, that the Dew should fall vpon that, and no where else.

It is certaine, that the *Honey-dewes* are found more vpon *Oake-Leaues*, than vpon *Alb*, or *Beech*, or the like: But whether any Cause be, from the Lease it selfe, to concoct the Dew; Or whether it be only, that the Lease is Close and Smooth; (And therefore drinketh not in the Dew, but preferueth it;) may be doubted. It would be well inquired, whether *Manna* the Drug, doth fall but vpon certaine *Herbes* or *Leaues* only. *Flowers* that haue deepe *Sockets*, doe gather in the Bottome, a kinde of *Honey*; As *Honey-Suckles*; (both the *Woodbine*, and the *Trifoile*;) *Lillies*; and the like. And in them certainly the *Flower* beareth part with the Dew.

The Experience is, that the *Froth*, which they call *Woodseare*, (being like a kinde of Spittle,) is found but vpon certaine *Herbs*, and those Hot Ones; As *Lauender*, *Lauender-cotton*, *Sage*, *Hissop*, &c. Of the Cause of this enquire further; For it seemeth a Secret. There falleth also *Mildew* vpon *Corne*, and smuteth it; But it may be, that the same falleth also vpon other *Herbs*, and is not obserued.

It were good, Triall were made, whether the great Consent betweene *Plants* and *Water*, which is a principall Nourishment of them; will make an *Attraction* or Distance, and not at Touch only. Therefore take a *Vessell*, and in the middle of it make a false Bottome of course Canuasse: Fill it with Earth about the Canuasse, and let not the Earth be watred; Then sow some good *Seeds* in that Earth; But vnder the Canuasse, some halfe a foot in the Bottome of the Vessell, lay a great *Sponge*, thorowly wet in water; And let it lye so some ten Dayes; And see

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see whether the *Seeds* will sprout, and the *Earth* become more Moist, and the *Sponge* more drie. The *Experiment* formerly mentioned of the *Cucumber*, creeping to the Pot of Water, is farre stranger than this.

THe *Altering* of the *Sent*, *Colour*, or *Taste* of *Fruit*, by *Infusing*, *Mixing*, or *Letting* into the *Barke*, or *Root* of the *Tree*, *Herbe*, or *Flower*, any *Coloured*, *Aromaticall*, or *Medicinall* Substance; are but *Fancies*. The *Cause* is, for that those Things haue passed their Period, and nourish not. And all *Alteration* of Vegetables, in those Qualities, must be by somewhat, that is apt to goe into the Nourishment of the *Plant*. But this is true; that where *Kine* feed vpon *Wilde Garlicke*, their *Milke* tasteth plainly of the *Garlicke*: And the *Flesh* of *Muttons* is better tasted where the *Sheepe* feed vpon *Wilde Thyme*, and other wholesome *Herbs*. *Galen* also speaketh of the Curing of the *Scirrus* of the *Liner*, by *Milke* of a *Cow*, that feedeth but vpon certaine *Herbs*; And *Honey* in *Spaine* smelleth (apparently) of the *Rosemary*, or *Orange*, from whence the *Bee* gathereth it: And there is an old Tradition of a *Mayden* that was fed with *Napellus*; (which is counted the Strongest Poyson of all *Vegetables*;) which with vse did not hurt the *Maid*, but poisoned some that had Carnall Company with her. So it is obserued by some, that there is a vertuous *Bezoar*, and another without vertue; which appeare to the shew alike; But the Vertuous is taken from the Beast, that feedeth vpon the Mountaines, where there are *Theriackall Herbs*; And that without Vertue, from those that feed in the Valleyes, where no such *Herbes* are. Thus farre I am of Opinion; That as Steeped Wines and Beeres, are very *Medicinall*; and likewise Bread tempered with diuers Powders; So of *Meat* also (as *Flesh*, *Fish*, *Milke*, and *Egges*,) that they may be made of great vse for *Medicine*, and *Diet*, if the *Beasts*, *Fowle*, or *Fish*, be fed with a speciall kinde of food fit for the Disease. It were a dangerous Thing also for secret Em-poysonments. But whether it may be applyed vnto *Plants*, and *Herbs*, I doubt more; Because the Nourishment of them is a more common Iuyce; which is hardly capable of any speciall Qualitie, vntill the *Plant* doe assimilate it.

But lest our Incredulity may preiudice any profitable Operations in this kind, (especially since Many of the Ancients haue set them down,) We thinke good briefly to propound the foure *Meanes*, which they haue deuised of Making *Plants Medicinable*. The First is by *Slitting* of the *Root*, and *Infusing* into it the *Medicine*; As *Hellebore*, *Opium*, *Scammony*, *Triacle*, &c. And then binding it vp againe. This seemeth to me the least probable; Because the *Root* draweth immediately from the Earth; And so the Nourishment is the more Common, and lesse Qualified: And besides it is a long time in Going vp, ere it come to the *Fruit*. The Second way is, to *Perforate* the *Body* of the *Tree*, and there to *Infuse* the *Medicine*: Which is somewhat better: For if any Vertue be receiued from the *Medicine*, it hath the lesse way, and the lesse time, to goe vp. The Third is, the *Steeping* of the *Seed* or *Kernell* in some *Liquor*, where-
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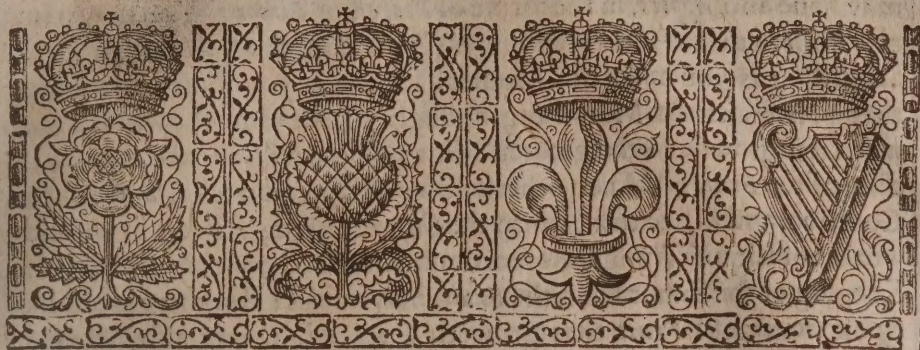
in the *Medicine* is *Infused*: which I haue little Opinion of, because the *Seed* (I doubt,) will not draw the Parts of the *Matter*, which haue the *Propriety*: But it will bee farre the more likely, if you mingle the *Medicine* with *Dung*; For that the *Seed* naturally drawing the *Moisture* of the *Dung*, may call in withall some of the *Propriety*. The fourth is, the *Watriing* of the *Plant* oft, with an *Infusion* of the *Medicine*. This, in one respect, may haue more force than the rest; Because the *Medication* is oft renewed; Whereas the rest are applyed but at one time: And therefore the Vertue may the sooner vanish. But still I doubt, that the *Root* is somewhat too stubborne to receiue those fine *Impressions*; And besides, (as I said before,) they haue a great *Hill* to goe vp. I iudge therefore the likeliest way to be the *Perforation* of the *Bodie* of the *Tree*, in *seuerall Places*, one above the other; And the *Filling* of the *Holes* with *Dung mingled with the Medicine*.

And the *Watriing* of those *Lumpes* of *Dung*, with
Squirts of an *Infusion* of the *Medicine* in
Dunged water, once in three
or foure Dayes.

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in the Medicine is to be used: which I have little Opinion of, because the
 Seed (I doubt) will not draw the Parts of the Matter, which have the
 Property: But it will be far the more likely, if you mingle the Me-
 dicine with Dung; For that the Seed naturally drawing the Matter of
 the Dung, may call in withall some of the Spirit. The fourth, the
 Way of the Plant, with an infusion of the Medicine. This is one
 respect, may have more force than the rest; Because the Medicine is
 oft renewed; Whereas the rest are applied but at one time: And
 therefore the Virtue may the sooner vanish. But still I doubt, that
 the Root is somewhat too stubborn to receive those fine Ingredients;
 And besides, (as I said before) they have a great Will to grow, I
 judge, therefore the likeliest way to be the Preparation of the Root
 of the Tree in several Places, one above the other; And the Fit-
 ting of the Root with Dung mingled with the Medicine.
 And the Mixture of those Amples of Dung, with
 Spirits of an infusion of the Medicine in
 Dung of water, once in three
 or four Days.

NATV.



NATVRALL HISTORIE.

VI. Century.



V R *Experiments* we take care to be (as we haue often said) either *Experimenta Fructifera*, or *Lucifera*; Either of *Vse*, or of *Discovery*: For we hate *Impostures*; And despise *Curiosities*. Yet because we must apply our Selues somewhat to Others, we will set downe some *Curiosities* touching *Plants*.

It is a *Curiosity*, to haue *seuerall Fruits* vpon *one Tree*; And the more, when some of them come *Early*, and some come *Late*; So that you may haue vpon the same *Tree*, *Ripe Fruits* all Sommer. This is easily done, by Grafting of *seuerall Cions*, vpon *seuerall Boughes*, of a *Stock*, in a good *Ground*, plentifully fed. So you may haue all *Kindes of Cherries*, and all *kindes of Plums*, and *Peaches*, and *Apricots*, vpon *one Tree*; But I conceiue the *Diuersity* of *Fruits* must be such, as will graft vpon the same *Stocke*. And therefore I doubt, whether you can haue *Apples*, or *Peares*, or *Oranges*, vpon the same *Stocke*, vpon which you graft *Plummes*.

It is a *Curiosity* to haue *Fruits* of *Diuers Shapes*, and *Figures*. This is easily performed by Moulding them, when the *Fruit* is young, with Moulds of *Earth*, or *Wood*. So you may haue *Cucumbers*, &c. as Long

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as

Experiments
in Consort
touching *Curiosities* about
Fruits and
Plants.

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as a Cane; Or as Round as a Spheare; Or formed like a Crosse. You may haue also *Apples*, in the forme of *Pears*, or *Lemons*. You may haue also *Fruit* in more Accurate Figures; As we said of *Men*, *Beasts*, or *Birds*, according as you make the Moulds. Wherein you must vnderstand, that you make the Mould big enough, to containe the whole *Fruit*, when it is growne to the greatest: For else you will choake the Spreading of the *Fruit*; Which otherwise would spread it selfe, and fill the Concaue, and so bee turned into the *Shape* desired; As it is in Mould-workes of Liquid Things. Some doubt may bee conceiued, that the Keeping of the Sunne from the *Fruit*, may hurt it: But there is ordinary experience of *Fruit* that groweth Couered. *Quare* also, whether some small Holes, may not be made in the Wood, to let in the Sunne. And note, that it were best to make the Moulds partible, glued, or cemented together, that you may open them, when you take out the *Fruit*.

503

It is a *Curiosity*, to haue *Inscriptions*, or *Engrauings*, in *Fruit*, or *Trees*. This is easily performed, by *Writing* with a *Needle*, or *Bodkin*, or *Knife*, or the like, when the *Fruit*, or *Trees* are young; For as they grow, so the Letters will grow more large, and *Graphicall*.

Tencrisq̃ meos incidere Amores
Arboribus, crescent illa, crescetis Amores.

504

You may haue *Trees* apparelled with *Flowers*, or *Herbs*, by *Boring Holes* in the *Bodies* of them, and Putting into them *Earth* holpen with *Mucke*, and *Setting Seeds*, or *Slips*, of *Violets*, *Strawberries*, *Wilde-Thyme*, *Camomill*, and such like in the *Earth*. Wherein they doe but grow, in the *Tree*, as they doe in *Pots*; Though (perhaps) with some Feeding from the *Trees*. It would be tried also with *Shoots* of *Vines*, and *Roots* of *Red-Roses*; For it may be, they being of a more *Ligneous Nature*, will incorporate with the *Tree* in selfe.

505

It is an ordinary *Curiosity*, to *Forme Trees* and *Shrubs*, (as *Rosemary*, *Iuniper*, and the like,) into *Sundry Shapes*; which is done by Moulding them within, and Cutting them without. But they are but lame Things, being too small to keepe *Figure*: Great *Castles* made of *Trees* vpon *Frames* of *Timber*, with *Turrets*, and *Arches*, were matters of *Magnificence*.

506

Amongst *Curiosities*, I shall place *Colouration*, though it be somewhat better: For *Beauty* in *Flowers* is their *Preheminence*. It is obserued by some, that *Gilly-flowers*, *Sweet-Williams*, *Violets*, that are *Coloured*, if they be neglected, and neither *Watred*, nor *New Moulded*, nor *Transplanted*, will turne *White*. And it is probable, that the *White* with much culture, may turne *Coloured*. For this is certaine, that the *White Colour* commeth of *Scarcity* of *Nourishment*; Except in *Flowers* that are onely *White*, and admit no other *Colours*.

507

It is good therefore, to see what *Natures* doe accompany what *Colours*; For by that you shall haue *Light*, how to induce *Colours*, by Producing those *Natures*. *Whites* are more *Inodorate*, (for the most part,) than

than *Flowers* of the same kinde *Coloured*; As is found in *Single White*, *Violets*, *White-Roses*, *White Gilly-Flowers*, *White Stock-Gilly-Flowers*, &c. We finde also, that *Blossomes* of *Trees*, that are *White*, are commonly *Inodorate*; As *Cherries*, *Peares*, *Plummes*; Whereas those of *Apples*, *Crabs*, *Almonds*, and *Peaches*, are *Blushy*, and *Smell sweet*. The Cause is, for that the Substance that maketh the *Flower*, is of the thinnest and finest of the *Plant*; Which also maketh *Flowers* to be of so dainty *Colours*. And if it bee too *Sparing*, and *Thinne*, it attaineth no *Strength* of *Odour*; Except it be in such *Plants*, as are very *Succulent*; Whereby they need rather to be scanted in their *Nourishment*, than replenished, to haue them *sweet*. As we see in *White Satyrion*, which is of a *Dainty Smell*; And in *Beane-Flowers*, &c. And againe, if the *Plant* bee of *Nature*, to put forth *White Flowers* onely, and those not *thinne*, or *dry*, they are commonly of *rancke* and *sulfome Smell*; As *May-Flowers*, and *White Lillies*.

Contrariwise, in *Berries*, the *White* is commonly more *Delicate*, and *Sweet* in *Taste*, than the *Coloured*; As we see in *White Grapes*; In *White Raspes*; In *White Strawberries*; In *White Currans*, &c. The Cause is, for that the *Coloured* are more *iuyced*, and *courser iuyced*; And therefore not so well and equally *Concocted*; But the *White* are better proportioned, to the *Disgestion* of the *Plants*.

But in *Fruits*, the *White* commonly is *meaner*; As in *Peare-Plums*, *Damascins*, &c. And the *Choicest Plummes* are *Blacke*; The *Mulberry*, (which though they call it a *Berry*, is a *Fruit*;) is better the *Blacke*, than the *White*. The *Haruest White-Plumme*, is a *base Plumme*; And the *Verdaccio* and *White Date-Plumme*, are no very good *Plummes*. The Cause is, for that they are all *Ouer-watry*: Whereas an higher *Concoction* is required for *Sweetnesse*, or *Pleasure* of *Taste*; And therefore all your dainty *Plummes*, are a little *dry*, and come from the *Stone*; As the *Muscle-Plumme*, the *Damasin-Plumme*, the *Peach*, the *Apricot*, &c. Yet some *Fruits*, which grow not to bee *Blacke*, are of the *Nature* of *Berries*, *sweetest* such as are *Paler*; As the *Caur-Cherry*, which inclineth more to *White*, is *sweeter* than the *Red*; But the *Egriot* is more *sowre*.

Take *Gilly-Flower Seed*, of one kinde of *Gilly-Flower*: (As of the *Clone-Gilly-Flower*, which is the most *Common*;) And sow it; And there will come vp *Gilly-Flowers*, some of one *Colour*, and some of another, casually, as the *Seed* meeteth with *Nourishment* in the *Earth*; So that the *Gardeners* finde, that they may haue two or three *Roots* amongst an hundred, that are *rare*, and of great *Price*: As *Purple*, *Carnation* of seuerall *Stripes*; The Cause is (no doubt) that in *Earth*, though it be contiguous, and in one *Bed*, there are very seuerall *Iuyces*; And as the *Seed* doth casually meet with them, so it commeth forth. And it is noted especially, that those which doe come vp *Purple*, doe alwaies come vp *Single*; The *Iuyce*, as it seemeth, not being able to suffice a *Succulent Colour*, and a *Double Leaf*. This Experiment of seuerall Co-

lours, comming vp from one *Seed*, would be tried also in *Larkes-Foot*, *Monkes-Hood*, *Poppy*, and *Hollyoke*.

§ 11

Few *Fruits* are coloured *Red* within; The *Queene-Apple* is; And another *Apple*, called the *Rose-Apple*; *Mulberries* likewise; and *Grapes*, though most toward the *Skinne*. There is a *Peach* also, that hath a *Circle of Red* towards the *Stone*: And the *Egriot-Cherry* is somewhat *Red* within; But no *Peare*, nor *Warden*, nor *Plumme*, nor *Apricot*, although they haue (many times) *Red* sides, are Coloured *Red* within. The *Cause* may be enquired.

§ 12

The Generall Colour of *Plants* is *Greene*; which is a Colour that no *Flower* is of. There is a *Greenish Prime-Rose*, but it is *Pale* and scarce a *Greene*; The *Leaves* of some *Trees* turne a little *Murvy*, or *Reddish*; And they be commonly *Young Leaves* that doe so; As it is in *Oakes*, and *Vines*, and *Hasse*. *Leaves* rot into a *Yellow*; And some *Hollies* haue part of their *Leaves Yellow*, that are, (to all seeming,) as *Fresh* and *Shining*, as the *Greene*. I suppose also, that *Yellow* is a lesse *Succulent Colour*, than *Green*; And a degree neerer *White*. For it hath beene noted, that those *Yellow Leaves* of *Holly* stand euer towards the *North*, or *North-East*. Some *Roots* are *Yellow*, as *Carrets*; And some *Plants* *Blond-Red*, *Stalke* and *Leafe*, and all; as *Amaranthus*. Some *Herbs* incline to *Purple*, and *Red*; As a *Kinde of Sage* doth, and a *Kinde of Mint*, and *Rosa Solis*, &c. And some haue *White Leaves*, as another *Kinde of Sage*, and another *Kinde of Mint*; But *Azure*, and a *Faire Purple*, are neuer found in *Leaves*. This sheweth, that *Flowers* are made of a *Refined Iuyce*, of the *Earth*; And so are *Fruits*: But *Leaves* of a more *Course*, and *Common*.

§ 13

It is a *Curiosity* also to make *Flowers Double*; Which is effected by often *Remouing* them into *New Earth*; As on the contrary Part, *Double Flowers*, by neglecting, and not *Remouing*, proue *Single*. And the Way to doe it speedily, is to sow or set *Seeds*, or *Slips of Flowers*; And as soone as they come vp, to remoue them into *New Ground*, that is good. Enquire also, whether *Inoculating of Flowers*, (as *Stock-Gilly-Flowers*, *Roses*, *Musk-Roses*, &c.) doth not make them *Double*. There is a *Cherry-Tree*, that hath *Double Blossomes*; But that *Tree* beareth no *Fruit*; And, it may be, that the same *Meanes*, which applied to the *Tree*, doth extremely accelerate the *Sap* to rise, and breake forth; Would make the *Tree* spend it selfe in *Flowers*, and those to become *Double*; Which were a great pleasure to see; Especially in *Apple-Trees*, *Peach-Trees*, and *Almond-Trees*, that haue *Blossomes* *Blush-Coloured*.

§ 14

The *Making of Fruits*, without *Core* or *Stone*, is likewise a *Curiosity*; And somewhat better: Because whatsoeuer maketh them so, is like to make them more *Tender* and *Delicate*. If a *Cions* or *Shoot*, fit to be set in the *Ground*, haue the *Pith* finely taken forth, (and not altogether, but some of it left, the better to saue the life,) it will beare a *Fruit* with little, or no *Core*, or *Stone*. And the like is said to bee, of diuiding a *Quick-Tree* downe to the *Ground*, and Taking out the *Pith*, and then binding it vp againe.

It is reported also, that a *Citron* grafted vpon a *Quince*, will haue small or no *Seeds*; And it is very probable, that any *Sowre Fruit*, grafted vpon a *Stock*, that beareth a *Sweeter Fruit*, may both make the *Fruit* sweeter, and more void of the harsh matter of *Kernels* or *Seeds*.

It is reported, that not onely the *Taking out* of the *Pith*, but the *Stopping* of the *Iuyce* of the *Pith*, from *Rising* in the *Middest*, and *Turning* it to rise on the *Outside*, will make the *Fruit* without *Core*, or *Stone*; As if you should bore a *Tree* cleane thorow, and put a wedge in. It is true, there is some *Affinity* betweene the *Pith* and the *Kernell*, because they are both of a harsh *Substance*, and both placed in the *Middest*.

It is reported, that *Trees* watered perpetually with *Warme Water*, will make a *Fruit*, with little or no *Core*, or *Stone*. And the *Rule* is generall, that whatsoeuer will make a *Wild-Tree* a *Garden-Tree*, will make a *Garden-Tree* to haue lesse *Core*, or *Stone*.

THe *Rule* is certaine, that *Plants* for want of *Culture*, degenerate to be baser in the same *Kinde*; And sometimes so farre, as to change into another *Kinde*. 1. The *Standing long*, and not being *Remoned*, maketh them degenerate. 2. *Drought*, vnlesse the *Earth* of it selfe be moist, doth the like. 3. So doth *Remoning into worse Earth*, or *Forbearing to Compost the Earth*; As we see that *Water-Mint* turneth into *Field-Mint*; And the *Colewort* into *Rape* by *Neglect*, &c.

Whatsoeuer *Fruit* useth to be set vpon a *Root*, or a *Slip*, if it be sowne, will degenerate. *Grapes* sowne; *Figs*, *Almonds*, *Pomgranate Kernels* sowne; make the *Fruits* degenerate, and become *Wilde*. And againe, Most of those *Fruits* that vse to be grafted, if they be set of *Kernels*, or *Stones*, degenerate. It is true, that *Peaches* (as hath becne touched before) doe better vpon *Stones* Set, than vpon *Grafting*: And the *Rule* of *Exception* should seeme to be this; That whatsoeuer *Plans* requireth much *Moisture*, prospereth better vpon the *Stone*, or *Kernell*, than vpon the *Graft*. For the *Stocke*, though it giueth a finer *Nourishment*, yet it giueth a scanter, than the *Earth* at large.

Seeds, if they be very *Old*, and yet haue strength enough to bring forth a *Plant*, make the *Plant* degenerate. And therefore skillfull *Gardiners* make triall of the *Seeds*, before they buy them, whether they be good or no, by *Putting* them into *Water* gently *Boiled*; And if they be good, they will sprout within *Halfe an Houre*.

It is strange which is reported, that *Basil* too much exposed to the *Sunne*, doth turne into *Wilde Thyme*: Although those two *Herbs* seeme to haue small *Affinity*; but *Basil* is almost the only *Hot Herbe*, that hath *Far* and *Succulent Leaues*; Which *Oylineffe*, if it be drawne forth by the *Sunne*, it is like it will make a very great *Change*.

There is an old *Tradition*, that *Boughs of Oake*, put into the *Earth*, will put forth *Wilde Vines*: Which if it be true (no doubt) it is not the *Oake* that turneth into a *Vine*, but the *Oake-Bough* putrifying, qualificeth the *Earth*, to put forth a *Vine* of it selfe.

§ 15

§ 16

§ 17

Experiments
in Consort
touching the
Degenerating
of Plants; And
of the Transmu-
tation of them,
one into ano-
ther.

§ 18

§ 19

§ 20

§ 21

§ 22

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It is not impossible, and I haue heard it verified, that vpon Cutting downe of an Old Timber-Tree, the *Stub* hath put out sometimes a Tree of another Kinde; As that *Beech* hath put forth *Birch*; Which, if it bee true, the Cause may be, for that the old *Stub* is too scant of Iuyce, to put forth the former Tree; And therefore putteth forth a Tree of a finaller kinde, that needeth lesse Nourishment.

524

There is an Opinion in the Countrey, that if the same Ground be oft sowne, with the Graine that grew vpon it, it will in the end, grow to be of a baser kinde.

525

It is certaine, that in very Sterile Yeeres, Corne sowne will grow to an Other Kinde.

*Grandia saepe quibus mandauimus Hordea Sulcis,
Infelix Lolium, & steriles dominantur Avena.*

And generally it is a Rule, that Plants, that are brought forth by Culture, as Corne, will sooner change into other Species, than those that come of themselves: For that Culture giueth but an Aduentitious Nature, which is more easily put off.

This worke of the Transmutation of Plants, one into another, is inter Magnalia Naturæ: For the Transmutation of Species is, in the vulgar Philosophy, pronounced Impossible: And certainly, it is a thing of difficultie, and requireth deepe Search into Nature: But seeing there appeare some manifest Instances of it, the Opinion of Impossibility is to bereiected; And the Meanes thereof to bee found out. Wee see, that in Living Creatures, that come of Putrefaction, there is much Transmutation, of one into another; As Catterpillars turne into Flies, &c. And it should seeme probable, that whatsoever Creature, hauing life, is generated without Seed, that Creature will change out of one Species into another. For it is the Seed, and the Nature of it, which locketh and boundeth in the Creature, that it doth not expatiate. So as we may well conclude, that seeing the Earth, of it selfe, doth put forth Plants, without Seed, therefore Plants may well haue a Transmigration of Species. Wherefore wanting Instances, which doe occurre, wee shall giue Directions of the most likely Trialls: And generally, we would not haue those, that read this our Worke of Sylua Sylvarum, account it strange, or thinke that it is an Ouer-Haste, that wee haue set downe Particulars vntried; For contrariwise, in our owne Estimation, we account such Particulars, more worthy, than those that are already

ready tried and knowne. For these Later must be taken as you finde them; But the Other doe leuell Point blanke at the *Inuenting of Causes, and Axiomes.*

First therefore you must make account, that if you will haue one *Plant* change into another, you must haue the *Nourishment* over-rule the *Seed*; And therefore you are to practise it by *Nourishments* as contrary, as may be, to the *Nature of the Herbe*; So neuerthelesse as the *Herbe* may grow; And likewise with *Seeds* that are of the *Weakest Sort*, and haue least *Vigour*. You shall doe well therefore, to take *Marsh-Herbs*, and Plant them vpon *Tops of Hills*, and *Champaignes*; And such *Plants* as require much *Moisture*, vpon *Sandy* and very dry *Grounds*. As for Example, *Marsh-Mallows*, and *Sedge*, vpon *Hills*; *Cucumber* and *Lettuce-Seeds*, and *Coleworts*, vpon a *Sandy Plot*: So contrariwise plant *Bushes*, *Heath*, *Ling*, and *Brakes*, vpon a *Wet or Marsh Ground*. This I conceiue also, that all *Esculent* and *Garden-Herbs*, set vpon the *Tops of Hills*, will proue more *Medicinall*, though lesse *Esculent*, than they were before. And it may be likewise, some *Wilde-Herbs* you may make *Sallet-Herbs*. This is the first Rule for *Transmutation of Plants*.

The second Rule shall be to bury some few *Seeds*, of the *Herbe* you would change, amongst other *Seeds*; And then you shall see, whether the *Iuyce* of those other *Seeds*, doe not so qualifie the *Earth*, as it will alter the *Seed*, whereupon you worke. As for Example; Put *Parsly-Seed* amongst *Onion-Seed*; Or *Lettuce-Seed* amongst *Parsly-Seed*; Or *Basil-Seed* amongst *Thyme-Seed*; And see the Change of *Taste*, or other wise. But you shall doe well, to put the *Seed* you would change, into a little linnen Cloth, that it mingle not with the forraine *Seed*.

The third Rule shall be, the *Making* of some *Medley* or *Mixture* of *Earth*, with some other *Plants* bruised, or *Shauen*, either in *Leafe* or *Root*: As for Example, make *Earth* with a *Mixture* of *Colewort-Leaues*, stamped, and set in it *Artichoakes*, or *Parsnips*; So take *Earth* made with *Maïoram*, or *Origanum*, or *Wilde-Thyme*, bruised, or stamped, and set in it *Fennell-Seed*, &c. In which Operation, the *Processe* of *Nature* still will be, (as I conceiue) not that the *Herbe* you worke vpon, should draw the *Iuyce* of the *Forraine Herbe*; (For that Opinion we haue formerly reiecte;) But that there will be a *New Confection* of *Mould*, which perhaps will alter the *Seed*, and yet not to the kinde of the former *Herbe*.

The fourth Rule shall be, to marke what *Herbs*, some *Earths* doe put forth of themselves; And to take that *Earth*, and to *Pot* it, or to *Vessell* it; And in that to set the *Seed* you would change: As for example, take from vnder *Walls*, or the like, where *Nettles* put forth in abundance, the *Earth* which you shall there finde, without any *String*, or *Root* of the *Nettles*; And *Pot* that *Earth*, and set in it *Stock-gilly-flowers*, or *Wall-Flowers*, &c. Or sow in the *Seeds* of them; And see what the *Euent* will be: Or take *Earth*, that you haue prepared to put forth *Mush-*

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comes, of it selfe, (whereof you shall finde some *Instances* following;) And sow in it *Purslane-Seed*, or *Lettuce-Seed*; For in these *Experiments*, it is likely enough, that the earth being accustomed to send forth one Kinde of Nourishment, will alter the new *Seed*.

530 The fifth Rule shall be, to make the *Herbe* grow contrary to his Nature; As to make *Ground-Herbs* rise in *Heighth*: As for example; Carry *Camomill*, or *Wilde-Thyme*, or the *Greene Strawberry*, vpon *Sticks*, as you doe *Hops* vpon *Poles*; and see what the Euent will be.

531 The sixth Rule shall be, to make *Plants* grow out of the *Sunne*, or *Open Aire*; For that is a great Mutation in Nature; And may induce a Change in the *Seed*: As barrell vp *Earth*, and sow some *Seed* in it, and put it in the Bottome of a Pond; Or put it in some great hollow *Tree*; Trie also the Sowing of *Seeds*, in the Bottomes of *Caves*; And *Pots* with *Seeds* sowne, hanged vp in *Wells*, some distance from the *Water*, and see what the Euent will be.

Experiments
in Consort,
touching the
Proceritie, and
Lownesse, and
Artificiall dwar-
fing of Trees.

IT is certaine, that *Timber-Trees* in *Coppice-Woods*, grow more vp-right, and more free from *Vnder-Boughes*, than those that stand in the *Fields*: The Cause whereof is, for that *Plants* haue a *Naturall Motion*, to get to the *Sunne*; And besides, they are not glutted with too much Nourishment; For that the *Coppice* shareth with them; And Repletion euer hindreth *Stature*; Lastly, they are kept warme; And that euer in *Plants* helpeth *Mounting*.

532

Trees, that are, of themselues, full of *Heat*, (which *Heat* appeareth by their *Inflammable Gummes*,) as *Firres*, and *Pines*, mount of themselues in *Heighth* without *Side-Boughes*, till they come towards the *Top*. The Cause is, partly *Heat*; And partly *Tenuitie* of *Iuyce*; Both which send the *Sap* vpwards. As for *Iuniper*, it is but a *Shrub*, and groweth not big enough in *Body*, to maintaine a tall *Tree*.

534

It is reported, that a Good Strong *Canuas*, spread ouer a *Tree* grafted low, soone after it putteth forth, will dwarfe it, and make it spread. The Cause is plaine; For that all Things that grow, will grow as they finde *Roome*.

535

Trees are generally set of *Roots*, or *Kernells*; But if you set them of *Slips*, (as of some *Trees* you may, by name the *Mulberry*,) some of the *Slips* will take; And those that take, (as is reported,) will be *Dwarfe-Trees*. The Cause is, for that a *Slip* draweth Nourishment more weakly, than either a *Root*, or *Kernell*.

536

All *Plants*, that put forth their *Sap* hastily, haue their *Bodies* not proportionable to their *Length*; And therefore they are *Winders*, and *Cree-pers*; As *Iuy*, *Briony*, *Hops*, *Woodbine*: Whereas *Dwarfing* requireth a slow Putting forth, and lesse *Vigour* of *Mounting*.

Experiments
in Consort,
touching the

The *Scripture* saith; that *Salomon* wrote a *Naturall History*, from the *Cedar of Libanus*, to the *Mosse* growing vpon the *Wall*:

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For so the best *Translations* haue it. And it is true that *Mosse* is but the *Rudiment* of a *Plant*; And (as it were) the *Mould* of *Earth*, or *Barke*.

Rudiments of
Plants, and of
the Excrescen-
ces of Plants, or
Super-Plants.

Mosse groweth chiefly vpon *Ridges* of *Houses*, tiled or thatched; And vpon the *Crests* of *Walls*. And that *Mosse* is of a lightsome, and pleasant *Greene*. The Growing vpon *Slopes* is caused, for that *Mosse*, as on the one side it commeth of *Moisture* and *Water*, so on the other side the *Water* must but *Slide*, and not *Stand* or *Poole*. And the Growing vpon *Tiles*, or *Walls*, &c. is caused, for that those dried *Earths*, hauing not *Moisture* sufficient to put forth a *Plant*, doe practise *Germination* by Putting forth *Mosse*; Though when by *Age*, or otherwise, they grow to relent and resolute, they sometimes put forth *Plants*; As *Wall-Flowers*. And almost all *Mosse* hath here and there little *Stalkes*, besides the low *Thrumme*.

537

Mosse groweth vpon *Alleyes*, especially such as lye *Cold*, and vpon the *North*; As in diuers *Tarrasses*: And againe, if they be much trodden; Or if they were, at the first, *grauelled*; For wherefoeuer *Plants* are kept downe, the *Earth* putteth forth *Mosse*.

538

Old Ground, that hath beene long vnbroken vp, gathereth *Mosse*: And therefore *Husbandmen* vse to cure their *Pasture Grounds*, when they grow to *Mosse*, by *Tilling* them for a yeare, or two: Which also dependeth vpon the same *Cause*; For that, the more *Sparing* and *Staruing* Iuyce of the *Earth*, insufficient for *Plants*, doth breed *Mosse*.

539

Old Trees are more *Mossie*, (farre) than *Young*; For that the *Sap* is not so francke as to rise all to the *Boughes*, but tireth by the way, and putteth out *Mosse*.

540

Fountaines haue *Mosse* growing vpon the *Ground* about them;

541

Muscosi Fontes; —————

The *Cause* is, for that the *Fountaines* draine the *Water* from the *Ground* *Adiacent*, and leaue but sufficient *Moisture* to breed *Mosse*: And besides, the *Coldnesse* of the *Water* conduceth to the same.

The *Mosse* of *Trees*, is a kinde of *Haire*; For it is the Iuyce of the *Tree*, that is *Excerned*, and doth not *Assimilate*. And vpon great *Trees* the *Mosse* gathereth a *Figure*, like a *Leafe*.

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The *moister Sort* of *Trees* yeeld little *Mosse*; As wee see in *Aspes*, *Poplars*, *Willowes*, *Beeches*, &c. Which is partly caused, for the Reason that hath beene giuen, of the francke Putting vp of the *Sap* into the *Boughes*; And partly, for that the *Barkes* of those *Trees*, are more *Close* and *Smooth*, than those of *Oakes*, and *Albes*; Whereby the *Mosse* can the hardlier issue out.

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In *Clay-Grounds*, all *Fruit-Trees* grow full of *Mosse*, both vpon *Body* and *Boughes*; Which is caused, partly by the *Coldnesse* of the *Ground*; whereby the *Plants* nourish lesse; And partly by the *Toughnesse* of the *Earth*, whereby the *Sap* is shut in, and cannot get vp, to spread so franckly, as it should doe.

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We haue said heretofore, that if *Trees* be *Hide-bound*, they wax lesse Fruitfull, and gather *Mosse*: And that they are holpen by *Hacking*, &c. And therefore by the Reason of Contraries, if *Trees* be bound in with *Cords*, or some Outward *Bands*, they will put forth more *Mosse*: Which (I thinke) happeneth to *Trees* that stand Bleake, and vpon the Cold Winds. It would also be tried, whether if you couer a *Tree*, somewhat thicke vpon the top, after his Powling, it will not gather more *Mosse*. I thinke also, the *Watring* of *Trees* with Cold *Fountaine-Water*, will make them grow full of *Mosse*.

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There is a *Mosse* the *Perfumers* haue, which commeth out of *Apple-Trees*, that hath an Excellent Sent. *Quere* particularly for the *Manner* of the *Growth*, and the *Nature* of it. And for this *Experiments* sake, being a Thing of Price, I haue set downe the last *Experiments*, how to multiply, and call on *Mosses*.

Next vnto *Mosse*, I will speake of *Mushromes*; Which are likewise an *Vnperfect Plant*. These *Mushromes* haue two strange *Properties*; The One, that they yeeld so *Delicious* a *Meat*; The other, that they *come vp* so *hastily*; As in a *Night*; And yet they are *Vnsowne*. And therefore, such as are *Vp-starts* in *State*, they call, in reproach, *Mushromes*. It must needs be therefore, that they bee made of much *Moisture*; And that *Moisture* Fat, *Grosse*, and yet somewhat *Concocted*. And (indeed) we finde that *Mushromes* cause the *Accident*, which we call *Incubus*, or the *Mare*, in the *Stomacke*. And therefore the *Surfet* of them may *Suffocate*, and *Empoyson*. And this sheweth, that they are *Windy*; And that *Windinesse* is *Grosse*, and *Swelling*; Not *Sharpe*, or *Griping*. And vpon the same reason *Mushromes* are a *venercous Meat*.

547

It is reported, that the *Barke* of *White*, or *Red Poplar*, (which are of the *Moistest* of *Trees*;) cut small, and cast into *Furrowes* well dunged, will cause the *Ground* to put forth *Mushromes*, at all *Seasons* of the *Yeare*, fit to be eaten. Some adde to the *Mixture* *Leauen* of *Bread*, resolued in *Water*.

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It is reported, that if a *Hilly-Field*, where the *Stubble* is standing, bee set on *Fire*, in a *Showrie Season*, it will put forth great *Store* of *Mushromes*.

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It is reported, that *Harts-Horne*, *Shauen*, or in *Small Peeeces*, mixed with *Dung*, and *waitred*, putteth vp *Mushromes*. And wee know *Harts-Horne* is of a *Fat* and *Clammie Substance*: And it may be *Oxe-Horne* would doe the like.

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It hath beene reported, though it be scarce credible, that *Iuy* hath growne out of a *Stags-Horne*; Which they suppose, did rather come from

from a *Confrication* of the *Horne* vpon the *Juy*, than from the *Horne* it selfe. There is not knowne any Substance, but *Earth*, and the *Procedures* of *Earth*, (as *Tile*, *Stone*, &c.) that yeeldeth any *Mosse*, or *Herby Substance*. There may be Triall made of some *Seeds*, as that of *Fennell-Seed*, *Mustard-Seed*, and *Rape-Seed*, put into some little *Holes*, made in the *Hornes* of *Stags*, or *Oxen*, to see if they will grow.

There is also another *Vnperfect Plant*, that (in shew) is like a great *Mushrome*: And it is sometimes as broad as ones Hat; Which they call a *Toads-Stoole*: But it is not *Esculent*; And it groweth (commonly) by a dead Stub of a *Tree*; And likewise about the *Roots* of *Rotten Trees*: And therefore seemeth to take his Iuyce from *Wood Putrified*. Which sheweth, by the way, that *Wood Putrified* yeeldeth a franke *Moisture*.

There is a *Cake*, that groweth vpon the Side of a *Dead Tree*, that hath gotten no Name, but it is large, and of a *Chestnut Colour*, and hard, and pithy; Whereby it should seeme, that euen *Dead Trees* forget not their Putting forth; No more than the *Carcasses* of *Mens Bodies*, that put forth *Haire*, and *Nayles*, for a Time.

There is a *Cod*, or *Bagge*, that groweth commonly in the *Fields*; That at the first is hard like a *Tennis-Ball*, and white; And after groweth of a *Mushrome Colour*, and full of light *Dust* vpon the Breaking: And is thought to be dangerous for the *Eyes*, if the *Powder* get into them; And to bee good for *Kibes*. Belike it hath a *Corrosiue*, and *Fretting Nature*.

There is an *Herbe* called *Iewes-Eare*, that groweth vpon the *Roots*, and *Lower Parts* of the *Bodies* of *Trees*; Especially of *Elders*, and sometimes *Ashes*. It hath a strange Property; For in *Warne-water*, it swelleth, and openeth extremely. It is not greene, but of a duskie browne Colour. And it is vsed for *Squinancies*, and *Inflammations* in the *Throat*; Whereby it seemeth to haue a *Mollifying*, and *Lenifying Vertue*.

There is a Kinde of *Spongie Excrecence*, which groweth chiefly vpon the *Roots* of the *Laser-Tree*; And sometimes vpon *Cedar*, and other *Trees*. It is very *White*, and *Light*, and *Friable*: Which we call *Agaricke*. It is famous in *Physicke* for the *Purging* of *Tough flegme*. And it is also an excellent *Opener* for the *Liner*: But *Offensiu*e to the *Stomacke*; And in *Taste* it is, at the first, *Sweet*, and after *Bitter*.

We finde no *Super-Plant*, that is a *Formed Plant*, but *Misseltoe*. They haue an idle Tradition, that there is a *Bird*, called a *Missel-bird*, that feedeth vpon a *Seed*, which many times shee cannot digest, and so expelleth it whole with her Excrement: which falling vpon a *Bough* of a *Tree*, that hath some *Rif*, putterth forth the *Misseltoe*. But this is a *Fable*: For it is not probable, that *Birds* should feed vpon that they cannot digest. But allow that, yet it cannot be for other Reasons: For First, it is found but vpon certaine *Trees*; And those *Trees* beare no such *Fruit*, as may allure that *Bird* to sit, and feed vpon them. It may be, that *Bird* feedeth vpon the *Misseltoe-Berries*, and so is often found there; Which may haue giuen occasion to the Tale. But that which maketh an End of the *Question*,

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tion, is, that *Misseltoe* hath beene found to put forth vnder the *Boughes*, and not (only) about the *Boughes*: So it cannot be any Thing that falleth vpon the *Bough*. *Misseltoe* groweth chiefly vpon *Crab-Trees*, *Apple-Trees*, sometimes vpon *Hawes*; And rarely vpon *Oakes*; The *Misseltoe* whereof is counted very *Medicinall*. It is euer greene, Winter and Summer; And beareth a *White Glistering Berry*: And it is a *Plant* vtterly differing from the *Plant*, vpon which it groweth. Two things therefore may be certainly set downe: First, that *Super-fatation* must be by *Abundance* of *Sap*, in the *Bough* that putteth it forth: Secondly, that that *Sap* must be such, as the *Tree* doth excerne, and cannot assimilate; For else it would goe into a *Bough*; And besides, it seemeth to be more Fat and Viscuous, than the Ordinary *Sap* of the *Tree*; Both by the *Berry*, which is Clammie; And by that it continueth greene, Winter and Summer, which the *Tree* doth not.

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This *Experiment* of *Misseltoe* may giue Light to other Practises. Therefore Triall would be made, by Ripping of the *Bough* of a *Crab-Tree*, in the Barke; And Watring of the Wound euery Day, with *Warmed Water Dugged*, to see if it would bring forth *Misseltoe*, or any such like Thing. But it were yet more likely to trie it, with some other *Watring*, or *Anointing*, that were not so Naturall to the *Tree*, as *Water* is; As *Oyle*, or *Barme* of *Drinke*, &c. So they be such Things as kill not the *Bough*.

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It were good to trie, what *Plants* would put forth, if they be forbidden to put forth their *Naturall Boughes*: Poll therefore a *Tree*, and couer it, some thicknesse, with *Clay* on the Top; And see what it will put forth. I suppose it will put forth *Roots*; For so will a *Cions*, being turned downe into *Clay*: Therefore, in this *Experiment* also, the *Tree* would be closed with somewhat, that is not so Naturall to the *Plant*, as *Clay* is. Trie it with *Leather*, or *Cloth*, or *Painting*, so it be not hurtfull to the *Tree*. And it is certaine, that a *Brake* hath beene knowne to grow out of a *Pollard*.

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A Man may count the *Prickles* of *Trees* to be a kinde of *Excrecence*; For they will neuer be *Boughes*, nor beare *Leaves*. The *Plants* that haue *Prickles*, are *Thornes*, blacke and white; *Brier*; *Rose*; *Limon-Trees*; *Crab-Trees*; *Goose-Berry*; *Berberis*; These haue it in the *Bough*; The *Plants* that haue *Prickles* in the *Leafe*, are; *Holly*; *Iuniper*; *Whin-bush*; *Thistle*; *Nettles* also haue a small Venemous *Prickle*; So hath *Burrage*, but harmelesse. The Cause must be *Hasty Putting forth*; *Want* of *Moisture*; And the Closenesse of the Barke; For the *Haste* of the *Spirit* to put forth, and the *Want* of *Nourishment* to put forth a *Bough*, and the Closenesse of the Barke, cause *Prickles* in *Boughes*; And therefore they are euer like a *Pyramis*, for that the *Moisture* spendeth after a little Putting forth. And for *Prickles* in *Leaves*, they come also of *Putting forth more Iuyce* into the *Leafe*, than can spread in the *Leafe* smooth; And therefore the *Leaves* otherwise are *Rough*, as *Borrage* and *Nettles* are. As for the *Leaves* of *Holly*, they are *Smooth*, but neuer *Plaine*, but as it were with *Folds*, for the same Cause.

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There bee also *Plants*, that though they haue no *Prickles*, yet they haue a Kinde of *Downy* or *Veluet Rime*, vpon their *Leaves*; As *Rose-Campion*, *Stock-Gilly-Flowers*, *Colts-Foot*; which *Downe*, or *Nap* commeth of a *Subtill Spirit*, in a *Soft* or *Fat Substance*. For it is certaine; that both *Stock-Gilly-Flowers*, and *Rose-Campions*, stamped, haue beene applyed, (with successe) to the *Wrests* of those that haue had *Tertian*, or *Quartan Agues*; And the *Vapour* of *Colts-Foot* hath a *Sanatiue* vertue, towards the *Lungs*; And the *Leafe* also is *Healing* in *Surgery*.

Another Kinde of *Excrecence* is an *Exudation* of *Plants*, ioyned with *Putrefaction*; As we see in *Oake-Apples*, which are found chiefly vpon the *Leaves* of *Oakes*; And the like vpon *Willowes*: And Countrey People haue a kinde of *Prediction*, that if the *Oake-Apple*, broken, be full of *Wormes*, it is a *Signe* of a *Pestilent Yeere*; Which is a likely Thing, because they grow of *Corruption*.

There is also vpon *Sweet*, or other *Brier*, a fine *Tuft*, or *Brush* of *Mosse*, of diuers Colours; Which if you cut, you shall euer finde full of little white *Wormes*.

IT is certaine, that *Earth*, taken out of the *Foundations* of *Vaults* and *Houses*, and *Bottomes* of *Wells*, and then put into *Pots*, will put forth Sundry Kinds of *Herbs*: But some *Time* is required, for the *Germination*; For if it be taken, but from a *Fashome* deepe, it will put forth the *First Yeere*; If much deeper, not till after a *Yeere*, or *Two*.

The *Nature* of the *Plants* growing out of *Earth* so taken vp, doth follow the *Nature* of the *Mould* it selfe; As if the *Mould* be *Soft*, and *Fine*, it putteth forth *Soft Herbs*; As *Grasse*, *Plantaine*, and the like; If the *Earth* be *Harder* and *Courser*, it putteth forth *Herbs* more *Rough*, as *Thistles*, *Firres*, &c.

It is Common *Experience*, that where *Alleyes* are close *Granelled*, the *Earth* putteth forth, the first yeere, *Knot-grasse*, and after *Spire-grasse*. The *Cause* is, for that the *Hard Granel*, or *Pebble* at the first *Laying*, will not suffer the *Grasse* to come forth vpright, but turneth it to finde his way where it can; But after that the *Earth* is somewhat loosened at the *Top*, the Ordinary *Grasse* commeth vp.

It is reported, that *Earth*, being taken out of *Shady* and *Watry Woods*, some depth, and Potted, will put forth *Herbs* of a *Fat* and *Iuicy Substance*; As *Penny-wort*, *Purslane*, *Housleeke*, *Penny-royall*, &c.

The *Water* also doth send forth *Plants*, that haue no *Roots* fixed in the *Bottome*; But they are lesse *Perfect Plants*, being almost but *Leaves*, and those Small ones: Such is that we call *Duck-Weed*; Which hath a *Leafe* no bigger than a *Thyme-Leafe*, but of a fresher *Greene*, and putteth forth a little *String* into the *Water*, farre from the *Bottome*. As for the *Water-Lilly*, it hath a *Root* in the *Ground*: And so haue a Number of other *Herbs* that grow in *Ponds*.

It is reported by some of the *Ancients*, and some *Moderne Testimony* likewise, that there be some *Plants*, that grow vpon the *Top* of the *Sea*;

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Being

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Experiments
in Consort
touching the
Producing of
Perfect Plants
without Seed.

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Being supposed to grow of some Concretion of Slime from the Water, where the Sunne beateh hot, and where the Sea stirreth little. As for *Alga Marina* (Sea-weed,) and *Eryngium* (Sea-Thistle,) both haue Roots; but the Sea-weed vnder the Water, the Sea-Thistle but vpon the Shore.

569

The Ancients haue noted, that there are some Herbs, that grow out of Snow, laid vp close together, and Putrified; And that they are all Bitter; And they name one specially, *Flomus*, which we call *Moth-Mullein*. It is certaine, that Wormes are found in Snow commonly, like *Earth-Wormes*; And therefore it is not vnlike, that it may likewise put forth Plants.

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The Ancients haue affirmed, that there are some Herbs, that grow out of Stone; Which may be, for that it is certaine, that *Toads* haue bin found in the Middle of a Free-Stone. We see also, that *Flints*, lying about Ground, gather *Mosse*; And *Wall-Flowers*, and some other Flowers, grow vpon Walls; But whether vpon the Maine *Bricke*, or *Stone*, or whether out of the *Lime* or *Chimneys*, is not well obserued; For *Elders* and *Asbes* haue beene seene to grow out of Steeples: But they manifestly grow out of Clefts; In so much as when they grow big, they wil disioyne the Stone. And besides it is doubtfull, whether the *Mortar* it selfe putteth it forth, or whether some Seeds bee not let fall by Birds. There be likewise *Rock-Herbs*; But I suppose those are, where there is some Mould, or Earth. It hath likewise beene found, that great Trees growing vpon Quarries, haue put downe their Roots into the Stone.

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In some Mines in Germany, as is reported, there grow in the Bortome Vegetables; And the Work-Folkes vse to say, they haue *Magical Vertue*; And will not suffer Men to gather them.

572

The Sea-Sands seldome beare Plants. Whereof the Cause is yeelded, by some of the Ancients, for that the Sunne exhaleth the Moisture, before it can incorporate with the Earth, and yeeld a Nourishment for the Plant. And it is affirmed also, that Sand hath (alwaies) his Root in Clay; And that there be no Veines of Sand, any great depth within the Earth.

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It is certaine, that some Plants put forth for a time, of their owne Store, without any Nourishment from Earth, Water, Stone, &c. Of which vide the Experiment 29.

Experiments
in Confort,
touching For-
raine Plants.

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It is reported, that Earth, that was brought out of the Indies, and other Remote Countries, for Ballast of Ships, cast vpon some Grounds in Italy, did put forth Forraine Herbs, to vs in Europe not knowne; And, that which is more, that of their Roots, Barkes, and Seeds, confused together, and mingled with other Earth, and well Watered with warme Water, there came forth Herbs much like the Other.

575

Plants brought out of Hot Countries, will endeouour to put forth, at the same Time, that they vsually doe in their owne Climate; And therefore to preserue them, there is no more required, than to keepe them from the Iniury of Putting backe by Cold. It is reported also, that Graine out

of the *Hotter Countries* translated into the *Colder*, will be more forward, than the Ordinary *Graine* of the *Cold Countrie*. It is likely, that this will proue better in *Graines*, than in *Trees*; For that *Graines* are but *Annuall*; And so the *Virtue* of the *Seed* is not worne out; Whereas in a *Tree*, it is embased by the *Ground*, to which it is Remoued.

Many *Plants*, which grow in the *Hotter Countries*; being set in the *Colder*, will neuerthelesse, euen in those *Cold Countries*, being sowne of *Seeds* late in the *Spring*, come vp and abide most Part of the *Summer*; As we finde it in *Orenges*, and *Limon-Seeds*, &c. The *Seeds* whereof, Sowne in the End of *Aprill*, will bring forth Excellent *Sallets*, mingled with other *Herbs*. And I doubt not, but the *Seeds* of *Cloue-Trees*, and *Pepper-Seeds*, &c. if they could come hither *Greene* enough to be sowne, would doe the like.

Here be some *Flowers*, *Blossomes*, *Graines*, and *Fruits*, which come more *Early*; And Others which come more *Late* in the *Yeere*. The *Flowers* that come early, with vs, are; *Prime-Roses*, *Violets*, *Anemonies*, *Water-Daffadillies*, *Crocus Vernus*, and some early *Tulippa's*. And they are all *Cold Plants*; Which therefore (as it should seeme) haue a quicker *Perception*, of the *Heat* of the *Sunne* Increasing, than the *Hot Herbs* haue; As a *Cold Hand* will sooner finde a little *Warmth*, than a *Hot*. And those that come next after, are *Wall-Flowers*, *Cowslips*, *Hyacinths*, *Rose-mary-Flowers*, &c. And after them, *Pincks*, *Roses*, *Flowerdeluces*, &c. And the latest are *Gilly-Flowers*, *Holly-oakes*, *Larkes-Foot*, &c. The Earliest *Blossomes* are, the *Blossomes* of *Peaches*, *Almonds*, *Cornelians*, *Mezerions*, &c. And they are of such *Trees*, as haue much *Moisture*, either *Watry*, or *Oylie*. And therefore *Crocus Vernus* also, being an *Herbe*, that hath an *Oily Iuyce*, putteth forth early. For those also finde the *Sunne* sooner than the *Drier Trees*. The *Graines* are, first *Rye* and *Wheat*; Then *Oats* and *Barley*; Then *Pease* and *Beanes*. For though *Greene Pease* and *Beanes* be eaten sooner, yet the *Drie Ones*, that are vsed for *Horse-meat*, are ripe last; And it seemeth that the *Fatter Graine* commeth first. The Earliest *Fruits* are, *Strawberries*, *Cherries*, *Gooseberries*, *Corrans*; And after them *Early Apples*, *Early Peares*, *Apricots*, *Rasps*; And after them *Damasks*, and most Kinde of *Plums*, *Peaches*, &c. And the latest are *Apples*, *Wardens*, *Grapes*, *Nuts*, *Quinces*, *Almonds*, *Sloes*, *Brier-Berries*, *Heps*, *Medlars*, *Seruices*, *Cornelians*, &c.

It is to be noted, that (commonly) *Trees* that ripen latest, blossom soonest: As *Peaches*, *Cornelians*, *Sloes*, *Almonds*, &c. And it seemeth to be a *Worke* of *Prouidence*, that they blossom so soone; For otherwise, they could not haue the *Sunne* long enough to ripen.

There be *Fruits*, (but rarely,) that come twice a *Yeare*; as some *Peares*, *Strawberries*, &c. And it seemeth they are such, as abound with *Nourishment*; Whereby after one *Period*, before the *Sunne* waxeth too weake, they can endure another. The *Violet* also, amongst *Flowers*, commeth twice a *Yeare*; Especially the *Double White*; And that also

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Experiments
in Confort
touching the
Seasons in
which Plants
come forth.

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is a *Plant* full of Moisture. *Roses* come twice, but it is not without *Cutting*, as hath beene formerly said.

580

In *Muscovia*, though the *Corne* come not vp, till late *Spring*, yet their *Haruest* is as Early as Ours. The *Cause* is, for that the *Strength* of the *Ground* is kept in with the *Snow*; And we see with vs, that if it bee a long *Winter*, it is commonly a more *Plentifull Yeere*: And after those kinde of *Winters* likewise, the *Flowers*, and *Corne*, which are Earlier, and Later, doe come commonly at once, and at the same time; Which troubleth the *Husbandman* many times; For you shall haue *Red Roses*, and *Damaske Roses*, come together; And likewise the *Haruest* of *Wheat* and *Barley*. But this happeneth euer, for that the Earlier staiech for the Later; And not that the Later commeth sooner.

581

There be diuers *Fruit-Trees*, in the *Hot Countries*, which haue *Blossomes*, and *Young Fruit*, and *Ripe Fruit*, almost all the *Yeere*, succeeding one another. And it is said, the *Orange* hath the like with vs, for a great Part of *Summer*; And so also hath the *Figge*. And no doubt, the *Naturall Motion* of *Plants*, is to haue so; But that either they want *Iuyce* to spend; Or they meet with the *Cold* of the *Winter*: And therefore this *Circle* of *Ripening* cannot be, but in *Succulent Plants*, and *Hot Countries*.

582

Some *Herbs* are but *Annuall*, and die, *Root* and all, once a *Yeere*; As *Borrage*, *Lettuce*, *Cucumbers*, *Muske-Melons*, *Basil*, *Tobacco*, *Mustard-Seed*, and all kindes of *Corne*; Some continue many *Yeeres*; As *Hyssope*, *Germander*, *Lauander*, *Fennell*, &c. The *Cause* of the *Dying* is double; The first is the *Tendernesse* and *Weaknesse* of the *Seed*, which maketh the *Period* in a small time; As it is in *Borrage*, *Lettuce*, *Cucumbers*, *Corne*, &c. And therefore none of these are *Hot*. The other *Cause* is, for that some *Herbs* can worse endure *Cold*; As *Basill*, *Tobacco*, *Mustard-Seed*. And these haue (all) much *Heat*.

Experimentes
in Confort
touching the
Lasting of Herbs
and Trees.

583

THe *Lasting* of *Plants* is most in those that are *Largest* of *Body*; As *Oakes*, *Elme*, *Chest-Nut*, the *Loat-Tree*, &c. And this holdeth in *Trees*; But in *Herbs* it is often contrary; For *Borage*, *Colewort*, *Pompions*, which are *Herbs* of the *Largest Size*, are of small *Durance*; Whereas *Hyssope*, *Winter-Sanory*, *Germander*, *Thyme*, *Sage*, will last long. The *Cause* is, for that *Trees* last according to the *Strength*, and *Quantity* of their *Sap* and *Iuyce*; Being well munit by their *Barke* against the *Iniuries* of the *Aire*: But *Herbs* draw a *Weake Iuyce*; And haue a *Soft Stalke*; And therefore those amongst them which last longest, are *Herbs* of *Strong Smell*, and with a *Sticky Stalke*.

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Trees that beare *Mast*, and *Nuts*, are commonly more lasting, than those that beare *Fruits*; Especially the *Moister Fruits*: As *Oakes*, *Beeches*, *Chest-nuts*, *Wall-nuts*, *Almonds*, *Pine-Trees*, &c. last longer than *Apples*, *Pears*, *Plums*, &c. The *Cause* is the *Fatnesse* and *Oilinesse* of the *Sap*; Which euer wasteth lesse, than the more *Watry*.

585

Trees, that bring forth their *Leaues* late in the *Yeere*, and cast them likewise late, are more *lasting*, than those that sprout their *Leaues* Early, or

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shed them betimes. The Cause is, for that the late *Comming forth* sheweth a *Moisture* more fixed; And the other more loose, and more easily resolved. And the same Cause is, that *Wilde Trees* last longer than *Garden-Trees*; And in the same kinde, those whose *Fruit* is *Acide*, more than those whose *Fruit* is sweet.

Nothing procureth the *Lasting* of *Trees*, *Bushes*, and *Herbs*, so much, as often *Cutting*: For euery *Cutting* causeth a Renouation of the *Iuyce* of the *Plant*; That it neither goeth so farre, nor riseth so faintly, as when the *Plant* is not *Cut*: Inasmuch as *Annall Plants*, if you cut them seasonably, and will spare the vse of them, and suffer them to come vp still young, will last more Yeeres than one; As hath beene partly touched; Such as is *Lettuce*, *Parslane*, *Cucumber*, and the like. And for *Great Trees*, we see almost all *Ouer-growne Trees*, in Church-yards, or neere Ancient Buildings, and the like, are *Pollards*, or *Dottards*, and not *Trees* at their full Height.

Some Experiment would be made, how by *Art* to make *Plants* more *Lasting* than their ordinary Period; As to make a *Stalke* of *Wheat*, &c. last a whole yeere. You must euer presuppose, that you handle it so, as the *Winter* killeth it not; For we speake only of *Prolonging* the *Naturall Period*. I conceiue, that the *Rule* will hold; That whatsoever maketh the *Herbe* come later, than at his time, will make it last longer time: It were good to try it, in a *Stalke* of *Wheat*, &c. set in the Shade, and encompassed with a Case of *Wood*, not touching the *Straw*, to keepe out *Open Aire*.

As for the Preservation of Fruits, and Plants, as well upon the Tree, or Stalke, as gathered, we shall handle it under the Title of Conseruation of Bodies.

THe Particular Figures of Plants we leaue to their Descriptions; But some few Things, in generall, we will obserue. *Trees* and *Herbs*, in the Growing forth of their *Boughes* and *Branches*, are not *Figured*, and keepe no Order. The Cause is, for that the *Sap*, being restrained in the *Rinde*, and *Barke*, breaketh not forth at all; (As in the Bodies of *Trees*, and *Stalkes* of *Herbs*,) till they begin to branch; And then, when they make an Eruption, they breake forth casually, where they finde best way, in the *Barke*, or *Rinde*. It is true, that some *Trees* are more scattered in their *Boughes*; As *Sallow-Trees*, *Warden-Trees*, *Quince-Trees*, *Medlar-Trees*, *Limon-Trees*, &c. Some are more in the forme of a *Pyramis*, and come almost to todd; As the *Peare-Tree*, (which the Critickes will haue to borrow his name of πῦρ, *Fire*,) *Orange-Trees*, *Fir-Trees*, *Seruice-Trees*, *Lime-Trees*, &c. And some are more spred and broad; As *Beeches*, *Hornbeame*, &c. The rest are more indifferent. The Cause of Scattering the *Boughes*, is the Hasty breaking forth of the *Sap*; And therefore those *Trees* rife not in a *Body* of any Height, but branch neere the *Ground*. The Cause of the *Pyramis*, is the Keeping in of the *Sap*, long before it branch; And the spending of it when it beginneth to branch, by equall degrees. The

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Spreading is caused by the *Carrying* vp of the *Sap*, plentifully, without Expende; And then putting it forth speedily, and at once.

There bee diuers *Herbs*, but no *Trees*, that may be said to haue some kinde of Order, in the Putting forth of their *Leaves*: For they haue *Joyns* or *Knuckles*, as it were Stops in their *Germination*; As haue *Gilly-Flowers*, *Pinkes*, *Fennell*, *Corne*, *Reeds*, and *Canes*. The Cause whereof is, for that the *Sap* ascendeth vnequally, and doth (as it were) tire and stop by the way. And it seemeth, they haue some *Closenesse*, and *Hardnesse* in their *Stalke*, which hindreth the *Sap* from going vp, vntill it hath gathered into a Knot, and so is more vrged to put forth. And therefore, they are most of them hollow, when the *Stalke* is dry. As *Fennell-Stalke*, *Stubble*, and *Canes*.

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Flowers haue (all) exquisite *Figures*; And the *Flower-Numbers* are (chiefly) *Fine*, and *Foure*; As in *Prime-Roses*, *Brier-Roses*, *Single Musk-Roses*, *Single Pinkes*, and *Gilly-Flowers*, &c. which haue five *Leaves*: *Lillies*, *Flower-de-Luces*, *Borage*, *Buglosse*, &c. which haue foure *Leaves*. But some put forth *Leaves* not Numbred; But they are euer small Ones; As *Mary-Golds*, *Trifoile*, &c. Wee see also, that the *Sockets*, and *Supporters* of *Flowers*, are *Figured*; As in the *Five Brethren* of the *Rose*; *Sockets* of *Gilly-Flowers*, &c. *Leaves* also are all *Figured*; Some Round, Some Long; None Square; And many iagged on the Sides; Which *Leaves* of *Flowers* seldome are. For I account the *Jagging* of *Pinkes*, and *Gilly-Flowers*, to be like the *Inequality* of *Oake-leaves*, or *Vine-Leaves*, or the like; But they seldome or neuer haue any small *Purles*.

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OF *Plants*, some few put forth their *Blossomes* before their *Leaves*; As *Almonds*, *Peaches*, *Cornelians*, *Black-Thorne*, &c. But most put forth some *Leaves* before their *Blossomes*; As *Apples*, *Peares*, *Plums*, *Cherries*, *White-Thorne*, &c. The Cause is, for that those, that put forth their *Blossomes* first, haue either an *Acute* and *Sharpe Spirit*; (And therefore commonly they all put forth early in the Spring, and ripen very late; As most of the Particulars before mentioned;) Or else an *Oily Iuyce*, which is apter to put out *Flowers*, than *Leaves*.

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Of *Plants*, some are *Greene* all *Winter*; Others cast their *Leaves*. There are *Greene* all *Winter*, *Holly*, *Iuy*, *Box*, *Firre*, *Eugh*, *Cypresse*, *Iuniper*, *Bayes*, *Rose-Mary*, &c. The Cause of the Holding *Greene*, is the Close and Compact *Substance* of their *Leaves*, and the *Pedicles* of them. And the Cause of that againe, is either the *Tough*, and *Viscous Iuyce* of the *Plant*; Or the *Strength* and *Heat* thereof. Of the first Sort is *Holly*, Which is of so *Viscous* a *Iuyce*, as they make *Bird-lime* of the *Barke* of it. The *Stalke* of *Iuy* is *Tough* and not *Fragile*, as we see in other small *Twigs* dry. *Firre* yeeldeth *Pitch*. *Box* is a fast and heavy *Wood*, as we see it in *Bowles*. *Eugh* is a *Strong* and *Tough Wood*, as we see it in *Bowes*. Of the second Sort is *Iuniper*, which is a *Wood* *Odorate*, and maketh a hot *Fire*. *Bayes* is likewise a *Hot* and *Aromaticall Wood*; And so is *Rose-Mary* for a *Shrub*. As for the *Leaves*, their *Density* appeareth, in that, either they are *Smooth* and

and Shining, as in *Bayes, Holly, Iuy, Box, &c.* Or in that they are Hard and Spiry, as in the rest. And Triall would be made of *Grafting of Rose-Mary, and Bayes, and Box, vpon a Holly-Stocke*; Because they are *Plants* that come all *Winter*. It were good to trie it also with *Grafts* of other *Trees*, either *Fruit-Trees*, or *Wilde-Trees*; To see whether they will not yeeld their *Fruit*, or beare their *Leaves*, later, and longer in the *Winter*; because the *Sap* of the *Holly* putteth forth most in the *Winter*. It may be also a *Mexerion-Tree*, grafted vpon a *Holly*, will proue both an *Earlier*, and a *Greater Tree*.

There be some *Plants*, that beare no *Flower*, and yet beare *Fruit*: There be some, that beare *Flowers*, and no *Fruit*: There be some that beare neither *Flowers*, nor *Fruit*. Most of the great *Timber-Trees*, (as *Oakes, Beeches, &c.*) beare no apparent *Flowers*: Some few (likewise) of the *Fruit-Trees*; As *Mulberry, Wall-nut, &c.* And some *Shrubs*, (as *Iuniper, Holly, &c.*) beare no *Flowers*. Diuers *Herbs* also beare *Seeds*, (which is as the *Fruit*,) and yet beare no *Flowers*; As *Paraslane, &c.* Those that beare *Flowers* and no *Fruit*, are few; As the *Double Cherry*, the *Sallow, &c.* But for the *Cherry*, it is doubtfull, whether it be not by *Art*, or *Culture*; For if it be by *Art*, then Triall would be made, whether *Apples*, and other *Fruits Blossomes*, may not be doubled. There are some Few, that beare neither *Fruit*, nor *Flower*; As the *Elme*, the *Poplars, Box, Brakes, &c.*

There bee some *Plants*, that shoot still vpwards, and can *Support* themselves; As the greatest Part of *Trees* and *Plants*: There be some Other, that *Creepe* along the *Ground*: Or *Winde* about other *Trees*, or *Props*, and cannot support themselves; As *Vines, Iuy, Briar, Briony, Wood-bines, Hops, Climatis, Camomill, &c.* The Cause is, (as hath beene partly touched,) for that all *Plants* (naturally) moue vpwards; But if the *Sap* put vp too fast, it maketh a slender *Stalke*, which will not support the weight: And therefore these latter Sort are all *Swift* and *Hasty* *Commers*.

THe first and most Ordinary *Helpe* is *Stercoration*. The *Sheeps-Dung* is one of the best; And next, the *Dung* of *Kine*: And thirdly, that of *Horses*: Which is held to be somewhat too hot, vnlesse it be mingled. That of *Pigeons* for a *Garden*, or a small *Quantitie* of *Ground*, excelleth. The *Ordering* of *Dung* is; If the *Ground* be *Arable*, to spread it immediately before the *Plowing* and *Sowing*; And so to *Plow* it in: For if you spread it long before, the *Sunne* will draw out much of the *Fatnesse* of the *Dung*: If the *Ground* be *Grazing Ground*, to spread it somewhat late, towards *Winter*; that the *Sunne* may haue the lesse *Power* to drie it vp. As for speciall *Composts* for *Gardens*, (as a *Hot Bed, &c.*) wee haue handled them before.

The Second *Kind* of *Compost*, is, the *Spreading* of diuers *Kinds* of *Earths*; As *Marle, Chalke, Sea-Sand, Earth vpon Earth, Pond-Earth*; And the *Mixtures* of them. *Marle* is thought to be the best; As hauing most *Fatnesse*; And

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And not Heating the *Ground* too much. The next is *Sea-Sand*; Which (no doubt) obtaineth a speciall Vertue, by the *Salt*: For *Salt* is the first Rudiment of life. *Chalke* over-heateth the *Ground* a little. And therefore is best vpon *Cold Clay-Grounds*, or *Moist Grounds*: But I heard a great *Husband* say, that it was a common Errour, to think that *Chalke* helpeth *Arable Grounds*, but helpeth not *Grazing Grounds*; Whereas (indeed) it helpeth *Grasse*, as well as *Corne*: But that which breedeth the Errour is, because after the *Chalking* of the *Ground*, they weare it out with many *Crops*, without Rest; And then (indeed) afterwards it will beare little *Grasse*, because the *Ground* is tired out. It were good to try the laying of *Chalke* vpon *Arable Grounds*, a little while before *Plowing*; And to *Plow* it in, as they doe the *Dung*; But then it must be Friable first, by *Raine*, or *Lying*: As for *Earth*, it *Compasseth* it Selfe; For I knew a *Great Garden*, that had a *Field* (in a manner) powred vpon it; And it did beare *Fruit* excellently the first yeare of the *Planting*: For the *Surface* of the *Earth* is euer the *Fruitfullest*. And *Earth* so prepared hath a double *Surface*. But it is true, as I conceiue, that such *Earth*, as hath *Salt-Petre* bred in it, if you can procure it without too much charge, doth excell. The way to hasten the *Breeding* of *Salt-Petre*, is to forbid the *Sunne*, and the *Growth* of *Vegetables*. And therefore, if you make a large Houell, thatched, ouer some Quantity of *Ground*; Nay if you doe but Plancke the *Ground* ouer, it will breed *Salt-Petre*. As for *Pond-Earth*, or *River-Earth*, it is a very good *Compost*; Especially if the *Pond* haue beene long vncleanfed, and so the *Water* be not too Hungry: And I iudge it will be yet better, if there be some *Mixture* of *Chalke*.

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The Third *Helpe* of *Ground*, is, by some other *Substances*, that haue a Vertue to make *Ground* Fertile; though they be not meere *Earth*: wherein *Asbes* excell; In so much as the Countries about *Aetna*, and *Vesunius*, haue a kinde of Amends made them, for the Mischiefe the *Eruptions* (many times) doe, by the exceeding *Fruitfulnessse* of the *Soyle*, caused by the *Asbes*, scattered about. *Soot* also, though thin spred, in a *Field*, or *Garden*, is tried to be a very good *Compost*. For *Salt*, it is too Costly: But it is tried, that mingled with *Seed-Corne*, and sown together, it doth good: And I am of Opinion, that *Chalke* in Powder, mingled with *Seed-Corne*, would doe good; Perhaps as much as *Chalking* the *Ground* all ouer. As for the *Steeping* of the *Seeds*, in seuerall *Mixtures* with *Water*, to giue them Vigour; Or *Watring Grounds* with *Compost-Water*; We haue spoken of them before.

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The Fourth *Helpe* of *Ground*, is, the *Suffering* of *Vegetables* to die into the *Ground*; And so to Fatten it; As the *Stubble* of *Corne*, Especially *Pease*. *Brakes* cast vpon the *Ground*, in the Beginning of *Winter*, will make it very *Fruitfull*. It were good (also) to try, whether *Leaves* of *Trees* swept together, with some *Chalke* and *Dung* mixed, to giue them more Heart, would not make a good *Compost*: For there is nothing lost, so much as *Leaves* of *Trees*; And as they lye scattered, and without *Mixture*, they rather make the *Ground* soure, than otherwise.

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The Fifth *Helpe* of *Ground*, is *Heat* and *Warmth*. It hath beene anciently practised to burne *Heath*, and *Ling*, and *Sedge*, with the vantage of the *Wind*, vpon the *Ground*: We see, that *Warmth* of *Walls* and *Enclosures*, mendeth *Ground*: Wee see also that *Lying open* to the *South*, mendeth *Ground*: We see againe, that the *Foldings* of *Sheepe* helpe *Ground*, as well by their *Warmth*, as by their *Compost*: And it may be doubted, whether the *Couering* of the *Ground* with *Brakes*, in the Beginning of the *Winter*, (whereof we spake in the last *Experiment*,) helpeth it not, by reason of the *Warmth*. Nay some very good *Husbands* doe suspect, that the *Gathering* vp of *Flints*, in *Flinty Ground*, and Laying them on *Heapes*, (which is much vsed,) is no good *Husbandry*; For that they would keepe the *Ground* warme.

The Sixth *Helpe* of *Ground* is, by *Watering*, and *Irrigation*; which is in two Manners: The one by *Letting* in, and *Shutting* out *Waters*, at seasonable Times: For *Water*, at some Seasons, and with reasonable stay, doth good; But at some other Seasons, and with too long Stay, doth hurt. And this serueth only for *Meadowes*, which are along some *Riuer*. The other way is, to bring *Water*, from some *Hanging Grounds*, where there are *Springs*, into the *Lower Grounds*, carrying it in some long *Furrowes*; And from those *Furrowes*, drawing it trauesse to spread the *Water*. And this maketh an excellent Improvement, both for *Cornes*, and *Grasse*. It is the richer, if those *Hanging Grounds* be fruitfull, because it washeth off some of the *Fatnesse* of the *Earth*: But howsoeuer it profiteth much. Generally, where there are great *Ouerflowes*, in *Fens*, or the like, the drowning of them in the *Winter*, maketh the *Summer* following more fruitfull: The *Cause* may be, for that it keepeth the *Ground* warme, and nourisheth it: But the *Fen-Men* hold, that the *Sewers* must be kept so, as the *Water* may not stay too long in the *Spring*, till the *Weeds* and *Sedge* be growne vp; For then the *Ground* will be like a *Wood*, which keepeth out the *Sunne*; And so continueth the *Wet*; Whereby it will neuer graze (to purpose) that yeare. Thus much for *Irrigation*. But for *Avoidances*, and *Draynings* of water, where there is too much, and the *Helps* of *Ground* in that kinde, we shall speake of them in another Place.

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VII. Century.



He Differences betweene *Animate* and *Inanimate* Bodies, we shall handle fully vnder the Title of *Life*, and *Living Spirits*, and *Powers*. We shall therefore make but a brieft Mention of them in this Place. The Mainge Differences are two. All Bodies haue *Spirits*, and *Pneumaticall Parts* within them; But the Mainge Differences betweene *Animate* and *Inanimate*, are two: The first is, that the *Spirits of Things Animate*, are all Continued with themselves, and are Branched in *Veines*, and secret *Canales*, as *Bloud* is: And in *Living Creatures*, the *Spirits* haue not only *Branches*, but certaine *Cells* or *Seats*, where the *Principall Spirits* doe reside, and whereunto the rest doe resort: But the *Spirits* in *Things Inanimate* are shut in, and cut off by the *Tangible Parts*; And are not peruious one to another; As *Aire* is in *Snow*. The Second Mainge Difference is, that the *Spirits of Animate Bodies*, are all in some degree, (more or lesse,) kindled and inflamed; And haue a fine *Commixture of Flame*, and an *Aeriall Substance*. But *Inanimate Bodies* haue their *Spirits* no whit *Inflamed*, or *Kindled*. And this Difference consisteth not in the *Heat* or *Coolenesse of Spirits*; For *Clayes* and other *Spices*, *Naphtha* and *Petroleum*, haue exceeding *Hot Spirits*, (hotter a great deale than *Oyle*, *Wax*, or *Tallow*, &c.) but not *Inflamed*. And when any of those *Weake* and *Temperate Bodies* come to

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to be Inflamed, then they gather a much greater *Heat*, than others haue *Vn-inflamed*; besides their *Light*, and *Motion*, &c.

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The *Differences*, which are *Secondary*, and proceed from these two *Radicall Differences*, are; First, *Plants* are all *Figurate* and *Determinate*, which *Inanimate Bodies* are not; For looke how farre the *Spirit* is able to Spread and Continue it selfe; So farre goeth the *Shape*, or *Figure*; And then is *determined*. Secondly, *Plants* doe nourish; *Inanimate Bodies* doe not: They haue an *Accretion*, but no *Alimentation*. Thirdly, *Plants* haue a *Period of Life*; which *Inanimate Bodies* haue nor. Fourthly, they haue a *Succession*, and *Propagation* of their *Kinde*; which is not in *Bodies Inanimate*.

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The *Differences* betweene *Plants*, and *Metalls* or *Fossiles*, besides those foure before mentioned, (For *Metalls* I hold *Inanimate*), are these: First, *Metalls* are more *Durable* than *Plants*: Secondly, they are more *Solid* and *Hard*: Thirdly, they are wholly *Subterrany*; Whereas *Plants* are part about *Earth*, and part vnder *Earth*.

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There be very few *Creatures*, that participate of the *Nature* of *Plants*, and *Metalls* both; *Corall* is one of the Nearest of both *Kindes*: Another is *Vitrioll*, for that is aptest to sprout with *Moisture*.

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Another speciall *Affinity* is betweene *Plants* and *Mould* or *Putrefaction*: For all *Putrefaction* (if it dissolue not in *Arefaction*) will in the end issue into *Plants*, or *Living Creatures* bred of *Putrefaction*. I account *Mosse*, and *Mushromes*, and *Agaricke*, and other of those kinds, to be but *Moulds* of the *Ground*, *Walls*, and *Trees*, and the like. As for *Flesh*, and *Fish*, and *Plants* themselves, and a Number of other things, after a *Mouldinesse*, or *Rottennesse*, or *Corrupting*, they will fall to breed *Wormes*. These *Putrefactions*, which haue *Affinity* with *Plants*, haue this *Difference* from them; That they haue no *Succession* or *Propagation*, though they *Nourish*, and haue a *Period of Life*, and haue likewise some *Figure*.

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I left once, by chance, a *Citron* cut, in a close Roome, for three Summer-Moneths, that I was absent; And at my Returne, there were grown forth, out of the Pith cut, *Tufts of Haires*, an Inch long, with little blacke Heads, as if they would haue beene some *Herbe*.

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The *Affinities* and *Differences* betweene *Plants* and *Living Creatures*, are these that follow. They haue both of them *Spirits Continued*, and *Branched*, and also *Inflamed*: But first in *Living Creatures*, the *Spirits* haue a *Cell* or *Seat*, which *Plants* haue not; As was also formerly said: And secondly, the *Spirits* of *Living Creatures* hold more of *Flame*, than the *Spirits* of *Plants* doe. And these two are the *Radicall Differences*. For the *Secondary Differences*, they are as follow. First, *Plants* are all *Fixed* to the *Earth*; Whereas all *Living Creatures* are seuered, and of themselves. Secondly, *Living Creatures* haue *Locall Motion*; *Plants* haue not. Thirdly, *Living Creatures* nourish from their *Vpper Parts*, by the *Mouth* chiefly; *Plants* nourish from below, namely from the *Roots*. Fourthly, *Plants* haue their *Seed* and *Seminall Parts* vppermost; *Living Creatures* haue

haue them lower-most: And therefore it was said, not elegantly alone, but Philosophically; *Homo est Planta inuersa; Man is like a Plant turned upwards*: For the *Root* in *Plants*, is as the *Head* in *Living Creatures*. Fifthly, *Living Creatures* haue a more exact *Figure* than *Plants*. Sixthly, *Living Creatures* haue more *Diuersity* of *Organs* within their *Bodies*, and (as it were) *Inward Figures*, than *Plants* haue. Seuenthly, *Living Creatures* haue *Sense*, which *Plants* haue not. Eighthly, *Living Creatures* haue *Voluntary Motion*, which *Plants* haue not.

For the *Difference* of *Sexes* in *Plants*, they are oftentimes by name distinguished; As *Male-Piony*, *Female-Piony*; *Male-Rose-mary*, *Female-Rose-mary*; *Hee-Holly*, *Shee-Holly*; &c. but *Generation* by *Copulation* (certainly) extendeth not to *Plants*. The neereſt approach of it, is betweene the *Hee-Palme*, and the *Shee-Palme*; which, (as they report,) if they grow neere, incline the One to the other: In so much as, (that which is more strange,) they doubt not to report, that to keepe the *Trees* vp-right from *Bending*, they tie *Ropes* or *Lines*, from the one to the other, that the *Contact* might be enioyed by the *Contact* of a *Middle Body*. But this may be Faigned, or at least Amplified. Neuerthelesse, I am apt enough to thinke, that this same *Binarium* of a Stronger and a Weaker, like vnto *Masculine* and *Feminine*, doth hold in all *Living Bodies*. It is confounded sometimes; As in some *Creatures* of *Putrefaction*, whereia no *Markes* of *Distinction* appeare: And it is doubled sometimes; As in *Hermaphrodites*: But generally there is a *Degree* of *Strength* in most *Species*.

The *Participles* or *Confiners* betweene *Plants* and *Living Creatures*, are such chiefly, as are *Fixed*, and haue no *Locall Motion* of *Remoue*, though they haue a *Motion* in their *Parts*; Such as are *Oysters*, *Cockles*, and such like. There is a Fabulous Narration, that in the *Northerne Countries*, there should be an *Herbe* that groweth in the likenesse of a *Lambe*, and feedeth vpon the *Grasse*, in such sort, as it will bare the *Grasse* round about. But I suppose, that the *Figure* maketh the *Fable*; For so we see, there be *Bee-Flowers*, &c. And as for the *Grasse*, it seemeth the *Plant*, hauing a great *Stalke* and *Top*, doth prey vpon the *Grasse*, a good way about, by drawing the *Iuyce* of the *Earth* from it.

THe *Indian Fig* boweth his *Roots* downe so low, in one yeere, as of it selfe it taketh *Root* againe: And so multiplieth from *Root* to *Root*; Making of one *Tree* a kinde of *Wood*. The *Cause* is the *Plenty* of the *Sap*, and the *Softnesse* of the *Stalke*, which maketh the *Bough*, being over-loaden, and not stiffely vpheld, weigh downe. It hath *Leaues*, as broad as a little *Target*, but the *Fruit* no bigger than *Beanes*. The *Cause* is, for that the Continuall *Shade* increaseth the *Leaues*, and abateth the *Fruit*; which neuerthelesse is of a pleasant Taste. And that (no doubt) is caused, by the *Supplenesse* and *Gentlenesse* of the *Iuyce* of that *Plant*, being that which maketh the *Boughes* also so Flexible.

It is reported by one of the *Ancients*, that there is a certaine *Indian Tree*,

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Tree, hauing few, but very great, *Leaues*, three Cubits long, and two broad; And that the *Fruit*, being of good Taste, groweth out of the *Barke*. It may be, there be *Plants*, that powre out the *Sap* so fast, as they haue no leifure, either to diuide into many *Leaues*, or to put forth *Stalks* to the *Fruit*. With vs *Trees* (generally) haue small *Leaues*, in comparison. The *Fig* hath the greatest; And next it the *Vine*, *Mulberry*, and *Sycamore*; And the Least are those of the *Willow*, *Birch*, and *Thorne*. But there be found *Herbs* with farre greater *Leaues* than any *Tree*; As the *Burre*, *Gourd*, *Cucumber*, and *Cole-wort*. The Cause is, (like to that of the *Indian Fig*,) the hasty and plentifull Putting forth of the *Sap*.

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There be three *Things* in vse for *Sweetnesse*; *Sugar*, *Honey*, *Manna*. For *Sugar*, to the *Ancients* it was scarce knowne, and little vsed. It is found in *Canes*: *Quare*, whether to the first *Knuckle*, or further vp? And whether the very *Barke* of the *Cane* it selfe do yeeld *Sugar* or no? For *Honey*, the *Bee* maketh it, or gathereth it; But I haue heard from one, that was industrious in Husbandry, that the labour of the *Bee* is about the *Wax*; And that he hath knowne in the beginning of *May*, *Honey-Combs* empty of *Honey*; And within a fortnight, when the Sweet *Dewes* fall, filled like a *Cellar*. It is reported also by some of the *Ancients*, that there is a *Tree* called *Occhus*, in the Valleys of *Hyrkania*, that distilleth *Honey* in the *Mornings*. It is not vnlike, that the *Sap* and *Teares* of some *Trees*, may be sweet. It may be also, that some sweet Iuyces, fit for many vses, may be concocted out of *Fruits*, to the Thickness of *Honey*, or perhaps of *Sugar*; The likeliest are *Raisins* of the Sunne, *Figs*, and *Corraps*: The Meanes may be enquired.

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The *Ancients* report of a *Tree*, by the *Persian Sea*, vpon the *Shore-Sands*, which is nourished with the *Salt-Water*; And when the *Tide* ebbeth, you shall see the *Roots*, as it were, bare without *Barke*, (being as it seemeth corroded by the *Salt*,) and grasping the *Sands* like a *Crab*; Which neuerthelesse beareth a *Fruit*. It were good to try some *Hard Trees*, as a *Serice-Tree*, or *Fir-Tree*, by setting them within the *Sands*.

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There be of *Plants*, which they vse for *Garments*, these that follow. *Hempe*; *Flax*; *Cotton*; *Nettles*, (whereof they make *Nettle-Cloth*;) *Sericum*, which is a *Growing Silke*; They make also *Cables* of the *Barke* of *Lime-Trees*. It is the *Stalke* that maketh the *Filaceous* Matter commonly; And sometimes the *Downe* that groweth about.

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They haue, in some *Countries*, a *Plant* of a *Rosy Colour*, which shutteth in the *Night*, Openeth in the *Morning*, and Openeth wide at *Noone*; which the *Inhabitants* of those *Countries* say is a *Plant* that *Sleepeth*. There be *Sleepers* enow then; For almost all *Flowers* doe the like.

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Some *Plants* there are, but rare, that haue a *Mossy* or *Downy Root*; And likewise that haue a Number of *Threds*, like *Beards*; As *Mandrakes*; whereof *Witches* and *Imposstours* make an vgly *Image*, giuing it the Forme of a *Face* at the *Top* of the *Root*, and leaue those *Strings* to make a broad *Beard* downe to the *Foot*. Also there is a Kinde of *Nard*, in *Creet*, (being a Kinde of *Phu*) that hath a *Root* hairy, like a *Rough-Footed-Doues* foot.

foot. So as you may see, there are of *Roots*, *Bulbous Roots*, *Fibrous Roots*, and *Hirsute Roots*. And, I take it, in the *Bulbous*, the Sap hasteneth most to the Aire, and Sunne: In the *Fibrous*, the Sap deligh teth more in the Earth, and therefore putteth downward: And the *Hirsute* is a Middle betweene both; That besides the Putting forth vpwads, and downwards, putteth forth in Round.

There are some *Teares of Trees*, which are kembed from the *Beards of Goats*: For when the *Goats* bite and crop them, especially in the Mornings, the Dew being on, the *Teare* commeth forth, and hangeth vpon their *Beards*: Of this Sort is some kinde of *Ladanum*.

The *Irrigation* of the *Plaine-Tree* by *Wine*, is reported by the *Ancients*, to make it Fruitfull. It would be tried likewise with *Roots*; For vpon *Seeds* it worketh no great Effects.

The way to carry *Forraine Roots*, a long Way, is to vessell them close in *Earthen Vessels*. But if the *Vessels* be not very Great, you must make some Holes in the Bottome, to giue some Refreshment to the *Roots*; Which otherwise (as it seemeth) will decay, and suffocate.

The ancient *Cinnamon*, was, of all other *Plants*, while it grew, the Dryest; And those Things, which are knowne to comfort other *Plants*, did make that more Sterill: For in *Showers* it prospered worst: It grew also amongst *Bushes* of other kindes, where commonly *Plants* doe not thrine: Neither did it loue the Sunne: There might be one Cause of all those Effects; Namely, the sparing Nourishment, which that *Plant* required. *Quare* how farre *Cassia*, which is now the Substitute of *Cinnamon*, doth participate of these Things.

It is reported by one of the *Ancients*, that *Cassia*, when it is gathered, is put into the *Skins of Beasts*, newly fleyed; And that the *Skins* Corrupting, and Breeding *Wormes*, the *Wormes* doe deuoure the *Pith* and *Marrow* of it, and so make it Hollow; But meddle not with the *Barke*, because to them it is bitter.

There were, in Ancient Time, *Vines*, of farre greater *Bodies*, than we know any; For there haue beene *Cups* made of them, and an *Image of Iupiter*. But it is like they were *Wilde Vines*; For the *Vines*, that they vse for *Wine*, are so often Cut, and so much Dugged and Dressed, that their Sap spendeth into the *Grapes*, and so the *Stalke* cannot increase much in *Bulke*. The *Wood of Vines* is very durable, without *Rotting*. And that which is strange, though no *Tree* hath the *Twigs*, while they are Greene, so brittle, yet the *Wood* dried is extreme Tough; And was vsed by the *Captaines of Armies*, amongst the *Romans*, for their *Cudgels*.

It is reported, that in some Places, *Vines* are suffered to grow like *Herbs*, spreading vpon the *Ground*; And that the *Grapes* of those *Vines* are very great. It were good to make triall, whether *Plants* that vse to be borne vpon by Props, will not put forth greater *Leaves*, and greater *Fruits*, if they be laid along the *Ground*; As *Hops*, *Iuy*, *Wood-bine*, &c.

Quinces, or *Apples*, &c. if you will keepe them long, drowne them in *Honey*; But because *Honey* (perhaps) will giue them a Taste Ouer-

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lufhious, it were good to make Triall in Powder of Sugar; Or in Syrrup of Wine onely Boyled to Height. Both these would likewise be tried in Oranges, Limons, and Pomgranats; For the Powder of Sugar, and Syrrup of Wine, will serue for more times than once.

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The Conseruation of Fruit would be also tried in Vessels, filled with fine Sand, or with Powder of Chalke; Or in Meale and Flower; Or in Dust of Oake-wood; Or in Mill.

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Such Fruits, as you appoint for Long Keeping, you must gather before they be full Ripe; And in a Faire and Dry Day, towards Noone; And when the Wind bloweth not South; And when the Moone is vnder the Earth; And in Decrease.

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Take Grapes, and hang them in an Empty Vessell, well Stopped; And set the Vessell, not in a Cellar, but in some dry Place; And it is said, they will last long. But it is reported by some, they will keepe better, in a Vessell halfe full of Wine, so that the Grapes touch not the Wine.

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It is reported, that the Preseruing of the Stalke, helpeeth to preserue the Grape; Especially if the Stalke be put into the Pith of Elder, the Elder not touching the Fruit.

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It is reported by some of the Ancients, that Fruit put in Bottles, and the Bottles let downe into Wells vnder Water, will keepe long.

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Of Herbs and Plants, some are good to eat Raw; As Lettuce, Endine, Parslane, Tarragon, Cresses, Cucumbers, Musk-Melons, Radish, &c. Others onely after they are Boyled, or haue Passed the Fire; As Parsley, Clary, Sage, Parsnips, Tarnips, Asparagus, Artichoakes, (though they also being young are eaten Raw:) But a Number of Herbs, are not Esculent at all; As Worme-wood, Grassie, Greene-Corne, Centory, Hyssope, Lawender, Balme, &c. The Causes are, for that the Herbs, that are not Esculent, do want the two Tastes, in which Nourishment resteth; Which are, Fat, and Sweet; And haue (contrariwise) Bitter and Ouer-strong Tastes, or a Iuyce so Crude, as cannot be ripened to the degree of Nourishment. Herbs and Plants, that are Esculent Raw, haue Fatnesse, or Sweetnesse, (as all Esculent Fruits;) Such are Onions, Lettuce, &c. But then it must bee such a Fatnesse, (for as for Sweet Things, they are in effect alwaies Esculent) as is not Ouer-grosse, and Loading of the Stomach; For Parsnips and Leeks haue Fatnesse; But it is too Grosse and Heauy without Boyling. It must be also in a Substance somewhat Tender; For we see Wheat, Barley, Artichoakes, are no good Nourishment, till they haue Passed the Fire; But the Fire doth ripen, and maketh them soft and tender, and so they become Esculent. As for Radish and Tarragon, and the like, they are for Condiments, and not for Nourishment. And euen some of those Herbes, which are not Esculent, are notwithstanding Poculents; As Hop's, Breome, &c. Quere what Herbs are good for Drinke, besides the two aforenamed; For that it may (perhaps) ease the Charge of Brewing, if they make Beere to require lesse Malt, or make it last longer.

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Parts fit for the Nourishment of Man, in Plants, are Seeds, Roots, and Fruits; But chiefly Seeds, and Roots, For Leanes, they giue no Nourishment,

ment, at all, or very little: No more doe *Flowers*, or *Blossomes*, or *Stalkes*. The Reason is, for that *Roots*, and *Seeds*, and *Fruits*, (in as much as all *Plants* consist of an *Oily* and *Watry Substance* commixed,) haue more of the *Oily Substance*; And *Leaues*, *Flowers*, &c. of the *Watry*. And secondly, they are more *Concocted*; For the *Root*, which continueth euer in the *Earth*, is still *Concocted* by the *Earth*; And *Fruits*, and *Graines*, (we see) are halfe a yeere, or more, in *Concocting*; Whereas *Leaues* are out, and *Perfekt* in a Moneth.

Plants (for the most part) are more strong, both in *Taste*, and *Smell*, in the *Seed*, than in the *Leafe*, and *Root*. The *Cause* is, for that in *Plants*, that are not of a *Fierce* and *Eager Spirit*, the *Vertue* is increased by *Concoction*, and *Maturation*, which is euer most in the *Seed*; But in *Plants*, that are of a *Fierce* and *Eager Spirit*, they are stronger whilest the *Spirit* is enclosed in the *Root*; And the *Spirits* doe but weaken and dissipate, when they come to the *Aire*, and *Sunne*; As we see it in *Onions*, *Garlicke*, *Dragon*, &c. Nay there be *Plants*, that haue their *Roots* very *Hot*, and *Aromaticall*; And their *Seeds* rather *Inspide*; As *Ginger*. The *Cause* is (as was touched before,) for that the *Heat* of those *Plants* is very *Diffipable*; which vnder the *Earth* is contained and held in; But when it commeth to the *Aire*, it exhalet.

The *Iuyces* of *Fruits* are either *Watry*, or *Oily*. I reckon amongst the *Watry*, all the *Fruits* out of which *Drinke* is expressed; As the *Grape*, the *Apple*, the *Peare*, the *Cherry*, the *Pomgranate*, &c. And there are some others, which, though they be not in vse for *Drinke*, yet they appeare to be of the same *Nature*; as *Plummes*, *Sernices*, *Mulberries*, *Rass*, *Orenges*, *Limons*, &c. And for those *Iuyces*, that are so fleshy, as they cannot make *Drinke* by Expression, yet (perhaps) they may make *Drinke* by Mixture of *Water*;

Poculag admistis imitantur vitea Sorbis.
And it may bee *Heps* and *Brier-Berries* would doe the like. Those that haue *Oily Iuyce*, are; *Olines*, *Almonds*, *Nuts* of all sorts, *Pine-Apples*, &c. And their *Iuyces* are all *Inflammable*. And you must obserue also, that some of the *Watry Iuyces*, after they haue gathered *Spirit*, will Burne and Enflame; As *Wine*. There is a Third Kinde of *Fruit*, that is sweet, without either *Sharpnesse* or *Oyline*: Such as is the *Fig*, and the *Date*.

It hath beene noted, that most *Trees*, and specially those that beare *Mast*, are fruitfull but once in two yeeres. The *Cause* (no doubt) is, the *Expence* of *Sap*; For many *Orchard-Trees*, well Cultured, will beare diuers yeeres together.

There is no *Tree*, which besides the *Naturall Fruit*, doth beare so many *Bastard-Fruits*, as the *Oake* doth: For besides the *Acorne*, it beareth *Galls*, *Oake-Apples*, and certaine *Oake-Nuts*, which are *Inflammable*; And certaine *Oake-Berries*, sticking close to the *Body* of the *Tree*, without *Stalke*. It beareth also *Misseltoc*, though rarely. The *Cause* of all these may be, the *Closenesse* and *Solidenesse* of the *Wood*, and *Pish* of the *Oake*; Which maketh seuerall *Iuyces* finde seuerall *Eruptions*. And therefore,

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if you will deuise to make any *Saper-Plants*, you must euer giue the *Sap* Plentifull Rising, and Hard Issue.

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There are two *Excreescences* which grow vpon *Trees*; Both of them in the Nature of *Mushromes*: The one the *Romans* called *Boletus*; Which groweth vpon the *Roots* of *Oakes*; and was one of the *Dainties* of their *Table*; The other is *Medicinall*, that is called *Agaricke*, (whereof we haue spoken before) which groweth vpon the *Tops* of *Oakes*; Though it be affirmed by some, that it groweth also at the *Roots*. I doe conceiue, that many *Excreescences* of *Trees* grow chiefly, where the *Tree* is dead, or faded; For that the *Naturall Sap* of the *Tree*, corrupteth into some *Preternaturall Substance*.

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The greater Part of *Trees* beare *Mast*, and *Best*, on the *Lower Boughs*; As *Oakes*, *Figs*, *Wall-Nuts*, *Peares*, &c. But some beare *Best* on the *Top-Boughes*; As *Crabs*, &c. Those that beare best below, are such, as *Shade* doth more good to, than *Hurt*. For generally all *Fruits* beare best lowest; Because the *Sap* tireth not, hauing but a short Way: And therefore in *Fruits* spred vpon *Walls*, the Lowest are the Greatest, as was formerly said; So it is the *Shade* that hindereth the *Lower Boughes*; Except it be in such *Trees*, as delight in *Shade*; Or at least beare it well. And therefore, they are either *Strong Trees*, as the *Oake*; Or else they haue large *Leaues*, as the *Walnut* and *Fig*; Or else they grow in *Pyramis*, as the *Pear*. But if they require very much *Sanne*, they beare best on the *Top*; As it is in *Crabs*, *Apples*, *Plums*, &c.

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There be *Trees* that beare best when they begin to be *Old*; As *Almonds*, *Peares*, *Vines*, and all *Trees* that giue *Mast*. The Cause is, for that all *Trees* that beare *Mast* haue an *Oily Fruit*; And *Young Trees* haue a more *Watry Iuyce*, and lesse *Concocted*; And of the same kinde also is the *Almond*. The *Pear* likewise, though it be not *Oily*, yet it requireth much *Sap*, and well *Concocted*; For we see it is a *Heauy Fruit*, and *Solid*; Much more than *Apples*, *Plummes*, &c. As for the *Vine*, it is noted, that it beareth more *Grapes* when it is *Young*; But *Grapes* that make better *Wine*, when it is *Old*; For that the *Iuyce* is better *Concocted*: And wee see that *Wine* is *Inflammable*; So as it hath a kinde of *Oylineffe*. But the most Part of *Trees*, amongst which are *Apples*, *Plummes*, &c. beare best when they are *Young*.

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There be *Plants*, that haue a *Milke* in them, when they are *Cut*; As *Figs*, *Old Lettuce*, *Sow-Thistles*, *Spurge*, &c. The Cause maybe an *Inception* of *Putrefaction*; For those *Milkes* haue all an *Acrimony*; though one would thinke they should be *Lenitive*. For if you write vpon *Paper*, with the *Milke* of the *Fig*, the *Letters* will not be seene, vntill you hold the *Paper* before the *Fire*, and then they wax *Browne*; Which sheweth that it is a *Sharpe* or *Fretting Iuyce*: *Lettuce* is thought *Poysonous*, when it is so *Old*, as to haue *Milke*; *Spurge* is a kinde of *Poyson* in it Selfe; And as for *Sow-Thistles*, though *Coneyes* eat them, yet *Sheepe* and *Cattell* will not touch them; And besides the *Milke* of them, rubbed vpon *Warts*, in short time, weareth them away: Which sheweth the *Milke*

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of them to be *Corrosive*. We see also, that *Wheat*, and other *Cornes* sown, if you take them forth of the *Ground*, before they sprout, are full of *Milke*; And the Beginning of *Germination* is euer a Kinde of *Putrefaction* of the *Seed*. *Euphorbium* also hath a *Milke*, though not very white, which is of a great *Acrimony*. And *Saladine* hath a yellow *Milke*, which hath likewise much *Acrimony*; For it cleanseth the *Eyes*. It is good also for *Cataracts*.

Mushromes are reported to grow, as well vpon the *Bodies* of *Trees*, as vpon their *Roots*, or vpon the *Earth*: And especially vpon the *Oake*. The *Cause* is, for that Strong *Trees*, are towards such *Excreescences*, in the Nature of *Earth*; And therefore Put forth *Mosse*, *Mushromes*, and the like.

There is hardly found a *Plant*, that yeeldeth a *Red Iuyce*, in the *Blade*, or *Bare*; Except it be the *Tree* that beareth *Sanguis Draconis*: Which groweth (chiefly) in the *Island Soquatra*: The *Herbe Amaranthus* (indeed,) is *Red* all ouer; And *Brasill* is *Red* in the *Wood*: And so is *Red Sanders*. That *Tree* of the *Sanguis Draconis*, groweth in the forme of a *Sugar-loafe*. It is like, that the *Sap* of that *Plant*, concocteth in the *Body* of the *Tree*. For we see that *Grapes*, and *Pomegranats*, are *Red* in the *Iuyce*, but are *Greene* in the *Teare*: And this maketh the *Tree* of *Sanguis Draconis*, lesser towards the *Top*; Because the *Iuyce* hasteneth not vp; And besides it is very *Astringent*; And therefore of *Slow Motion*.

It is reported, that *Sweet Mosse*, besides that vpon the *Apple-Trees*, groweth likewise (sometimes) vpon *Poplars*; And yet (generally) the *Poplar* is a *Smooth Tree* of *Barke*, and hath little *Mosse*. The *Mosse* of the *Larix Tree* burneth also *Sweet*, and sparkleth in the *Burning*. *Quare* of the *Mosses* of *Odorate Trees*; As *Cedar*, *Cypres*, *Lignum Aloës*, &c.

The *Death* that is most without *Paine*, hath beene nored to be, vpon the *Taking* of the *Potion* of *Hemlocke*; which in *Humanity* was the *Forme* of *Execution* of *Capitall Offenders* in *Athens*. The *Poyson* of the *Aspe*, that *Cleopatra* vsed, hath some affinity with it. The *Cause* is, for that the *Torments* of *Death* are chiefly raised by the *Strife* of the *Spirits*; And these *Vapours* quench the *Spirits* by *Degrees*; Like to the *Death* of an extreme *Old Man*. I conceive it is lesse *Painfull* than *Opium*, because *Opium* hath *Parts* of *Heat* mixed.

There be *Fruits*, that are *Sweet* before they be *Ripe*; As *Mirabolanes*; So *Fennell-Seeds* are *Sweet* before they ripen; and after grow *Spicie*. And some neuer *Ripen* to be *Sweet*; As *Tamarinds*, *Berberries*, *Crabs*, *Sloes*, &c. The *Cause* is, for that the former Kinde haue much and sub-*till Heat*, which causeth *Earely Sweetnesse*; The latter haue a *Cold* and *Acide Iuyce*, which no *Heat* of the *Sunne* can sweeten. But as for the *Mirabolane*, it hath *Parts* of *Contrary Natures*; For it is *Sweet*, and yet *Astringent*.

There be few *Herbes* that haue a *Salt Taste*; And contrariwise all *Blond* of *Liuing Creatures* hath a *Salinesse*: The *Cause* may be, for that *Salt*, though it be the *Rudiment* of *Life*, yet in *Plants* the *Originall Taste* remaineth

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remaineth not; For you shall haue them *Bitter, Sowre, Sweet, Biting*, but seldome *Salt*: But in *Liuing Creatures*, all those High *Tastes* may happen to be (sometimes) in the *Humours*, but are seldome in the *Flesh*, or *Substance*; Because it is of a more *Oily Nature*; which is not very Susceprible of those *Tastes*; And the *Saltnesse* it selfe of *Blond*, is but a light, and secret *Saltnesse*: And euen among *Plants*, some doe participate of *Saltnesse*, as *Alga Marina, Sampire, Scoruy-Grasse, &c.* And they report, there is, in some of the *Indian-Seas*, a *Swimming Plant*, which they call *Salgaxus*, spreading ouer the *Sea*, in such sort, as one would thinke it were a *Meadow*. It is certaine, that out of the *Asbes* of all *Plants*, they extract a *Salt*, which they vse in *Medicines*.

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It is reported by one of the *Ancients*, that there is an *Herb* growing in the *Water*, called *Lincoſtis*, which is full of *Prickles*: This *Herbe* putteth forth another small *Herbe* out of the *Leafe*; which is imputed to some *Moisture*, that is gathered betweene the *Prickles*, which Putrified by the *Sunne*, Germinateth. But I remember also I haue seene, for a great Rarity, one *Rose* grow out of another, like *Honey-Suckles*, that they call *Top* and *Top-gallants*.

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Barley, (as appeareth in the *Malting*,) being steeped in *Water* three dayes, and afterwards the *Water* drained from it, and the *Barley* turned vpon a drie floare, will sprout, halfe an Inch long at least: And if it be let alone, and not turned, much more; vntill the Heart be out. *Wheat* will doe the same. Try it also with *Pease*, and *Beanes*. This *Experiment* is not like that of the *Orpin*, and *Semper-Vine*; For there it is of the old Store, for no *Water* is added; But here it is nourished from the *Water*. The *Experiment* would be further driuen: For it appeareth already, by that which hath beene said, that *Earth* is not necessary to the first Sprouting of *Plants*; And we see that *Rose-Buds* set in *Water*, will Blow: Therefore try whether the *Sprouts* of such *Graines* may not be raised to a further Degree; As to an *Herbe*, or *Flower*, with *Water* only; Or some small Commixture, of *Earth*: For if they will, it should seeme by the *Experiments* before, both of the *Malt*, and of the *Roses*, that they will come far faster on in *Water*, than in *Earth*: For the *Nourishment* is easilier drawne out of *Water*, than out of *Earth*. It may giue some light also, that *Drinke* infused with *Flesh*, as that with the *Capon, &c.* will nourish faster and easilier, than *Meat* and *Drinke* together. Try the same *Experiment* with *Roots*, as well as with *Graines*: as for Example, take a *Turnip*, and steepe it a while, and then dry it, and see whether it will sprout.

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Malt in the *Drenching* will swell; And that in such a manner, as after the Putting forth in *Sprouts*, and the drying vpon the *Keele*, there will be gained at least a Bushell in eight, and yet the *Sprouts* are rubbed off; And there will be a Bushell of *Dust* besides the *Malt*: Which I suppose to be, not only by the loose, and open Laying of the *Parts*, but by some Addition of *Substance*, drawne from the *Water*, in which it was steeped.

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Malt gathereth a *Sweetnesse* to the *Taste*, which appeareth yet more in

in the *Wort*. The *Dulcoration* of *Things* is worthy to be tried to the full; For that *Dulcoration* importeth a degree to *Nourishment*: And the Making of *Things* *Inalimentall*, to become *Alimentall*, may be an *Experiment* of great Profit, for Making new *Victuall*.

Most *Seeds* in the Growing, leaue their *Huske* or *Rinde* about the *Root*; But the *Onion* will carry it vp, that it will be like a Cap vpon the Top of the *Young Onion*. The *Cause* may be, for that the *Skin* or *Huske* is not easie to breake; As we see by the Pilling of *Onions*, what a Holding Substance the *Skin* is.

Plants, that haue *Curled Leaues*, doe all abound with *Moisture*; Which commeth so fast on, as they cannot spread themselves *Plaine*, but must needs gather together. The Weakest Kinde of *Curling* is *Roughnesse*; As in *Clary*, and *Burre*. The Second is *Curling* on the Sides; As in *Lettuce*, and *Young Cabbage*: And the Third is *Folding* into an *Head*; As in *Cabbage* full growne, and *Cabbage-Lettuce*.

It is reported, that *Firre*, and *Pine*, especially if they be *Old* and *Putrefied*, though they shine not, as some *Rotten Woods* doe, yet in the sudden *Breaking* they will sparkle like *Hard Sugar*.

The *Roots* of *Trees* doe (some of them,) put downwards deepe into the *Ground*; As the *Oake*, *Pine*, *Firre*, &c. Some spread more towards the *Surface* of the *Earth*; As the *Asb*, *Cypresse-Tree*, *Oline*, &c. The *Cause* of this latter may be, for that such *Trees* as loue the *Sunne*, doe not willingly descend farre into the *Earth*; And therefore they are (commonly) *Trees*, that shoot vp much; For in their *Body*, their desire of Approach to the *Sunne*, maketh them spread the lesse. And the same Reason, vnder *Ground*, to auoid Reccess from the *Sunne*, maketh them spread the more. And we see it commeth to passe in some *Trees*, which haue beene planted too deepe in the *Ground*, that for loue of Approach to the *Sunne*, they forsake their first *Root*, and put out another more towards the *Top* of the *Earth*. And we see also, that the *Oline* is full of *Oily Iuyce*; And *Asb* maketh the best Fire; And *Cypresse* is an *Hot Tree*. As for the *Oake*, which is of the former sort, it loueth the *Earth*; And therefore groweth slowly. And for the *Pine*, and *Firre* likewise, they haue so much *Heat* in themselves, as they need lesse the *Heat* of the *Sunne*. There be *Herbs* also, that haue the same difference; As the *Herbe* they call *Morsus Diaboli*; Which putteth the *Root* downe so low, as you cannot pull it vp without *Breaking*; Which gaue Occasion to the *Name*, and *Fable*; For that it was said, it was so wholesome a *Root*, that the *Devill*, when it was gathered, bit it for *Enuy*: And some of the *Ancients* doe report, that there was a Goodly *Firre*, (which they desired to remoue whole,) that had a *Root* vnder *Ground* eight Cubits deepe; And so the *Root* came vp broken.

It hath beene obserued, that a *Branch* of a *Tree*, being *Unbarked* some space at the *Bottom*, and so set into the *Ground*, hath growen; Euen of such *Trees*, as if the *Branch* were set with the *Barke* on, they would not grow, yet contrariwise we see, that a *Tree* Pared round in the *Body*, aboue *Ground*,

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Ground, will die. The Cause may be, for that the *Unbarke Part* draweth the Nourishment best, but the *Barke* continueth it only.

655 *Grapes* will continue *Fresh*, and *Moist*, all Winter long, if you hang them, *Cluster* by *Cluster*, in the *Roofe* of a *Warme Roome*; Especially, if when you gather the *Cluster*, you take off with the *Cluster* some of the *Stocke*.

656 The *Reed* or *Cane* is a *Watry Plant*, and groweth not but in the *Water*; It hath these Properties; That it is *Hollow*; That it is *Knuckled* both *Stalke*, and *Root*; That being *Drie*, it is more *Hard* and *Fragile*, than other *Wood*; That it putteth forth no *Boughes*, though many *Stalkes* come out of one *Root*. It differeth much in Greatnesse; The smallest being fit for Thatching of Houses; And Stopping the Chinkes of Ships; Better than *Glew*, or *Pitch*. The Second Bignesse, is vsed for *Angle-Rods*, and *Staues*; And in *China* for beating of Offenders vpon the *Thighes*. The differing *Kindes* of them are; The *Common Reed*; The *Cassia Fistula*; And the *Sugar-Reed*. Of all *Plants*, it boweth the easiest, and riseth againe. It seemeth, that amongst *Plants*, which are nourished with *Mixture* of *Earth* and *Water*, it draweth most Nourishment from *Water*; which maketh it the *Smoothest* of all others in *Barke*; And the *Hottest* in *Bodie*.

657 The *Sap* of *Trees*, when they are let *Bloud*, is of differing *Natures*. Some more *Watry* and *Cleare*; As that of *Vines*; of *Beeches*; of *Peares*. Some *Thicke*; As *Apples*. Some *Gummie*; As *Cherries*. Some *Froathy*, As *Elmes*. Some *Milkie*; As *Figs*. In *Mulberries*, the *Sap* seemeth to be (almost) towards the *Barke* only; For if you cut the *Tree*, a little into the *Barke*, with a *Stone*, it will come forth; If you pierce it deeper with a *Toole*, it will be *drie*. The *Trees*, which haue the *Moistest Iuyces* in their *Fruit*, haue commonly the *Moistest Sap* in their *Body*; For the *Vines* and *Peares* are very *Moist*; *Apples* somewhat more *Spongie*: The *Milke* of the *Figge* hath the *Qualitie* of the *Rennet*, to gather *Cheese*: And so haue certaine *Sowre Herbes* wherewith they make *Cheese* in *Lent*.

658 The *Timber* and *Wood* are, in some *Trees*, more *Cleane*, in some more *Knottie*: And it is a good *Triall*, to trie it by *Speaking* at one End, and *Laying* the *Eare* at the Other: For if it be *Knottie*, the *Voyce* will not passe well. Some haue the *Veines* more varied, and chamlotted; As *Oake*, whereof *Wainscot* is made; *Maple*, whereof *Trenchers* are made: Some more smooth, as *Firre*, and *Walnut*: Some doe more easily breed *Wormes* and *Spiders*; Some more hardly, as it is said of *Irish Trees*: Besides, there be a Number of Differences that concerne their *Vse*; As *Oake*, *Cedar*, and *Chesnut*, are the best *Builders*: Some are best for *Plough-Timber*; As *Asb*: Some for *Peeres*, that are sometimes wet, and sometimes *drie*; As *Elme*: Some for *Flanchers*; As *Deale*: Some for *Tables*, *Cupboards*, and *Deskes*; As *Walnuts*: Some for *Ship-Timber*; As *Oakes* that grow in *Moist Grounds*; For that maketh the *Timber* *Tough*, and not apt to rift with *Ordinance*; Wherein *English* and *Irish Timber* are thought to excell: Some for *Masts* of *Ships*; As *Firre*, and *Pine*, because of their

Length.

Length, Srraightnesse, and Lightnesse: Some for *Pale*; As *Oake*: Some for *Fuell*; As *Ash*: And so of the rest.

The *Comming* of *Trees* and *Plants* in certaine *Regions*, and not in others, is sometimes *Casvall*: For many haue beene translated, and haue prospered well; As *Damask-Roses*, that haue not beene knowne in *England* about an hundred yeares, and now are so common. But the liking of *Plants* in certaine *Soiles*, more than in others, is meerely *Naturall*; As the *Firre* and *Pine* loue the *Mountaines*; The *Poplar*, *Willow*, *Sallow*, and *Alder*, loue *Riuers*, and *Moist Places*: The *Ash* loueth *Coppices*; But is best in *Standards* alone: *Iuniper* loueth *Chalke*; And so doe most *Fruit-Trees*: *Sampire* groweth but vpon *Rockes*: *Reeds* and *Osiers* grow where they are washed with *Water*: The *Vine* loueth *Sides of Hills*, turning vpon the *South-East Sunne*, &c.

The *Putting forth* of certaine *Herbes* discovereth of what *Nature* the *Ground* where they put forth, is: As *wilde Thyme* sheweth good *Feeding Ground* for *Cattell*: *Betony* and *Strawberries* shew *Grounds* fit for *Wood*: *Camomill* sheweth *Mellow Grounds* fit for *Wheat*. *Mustard Seed*, growing after the *Plough*, sheweth a good *Strong Ground* also for *Wheat*: *Burnet* sheweth good *Meadow*: And the like.

There are found, in diuers *Countries*, some other *Plants*, that grow out of *Trees* and *Plants*, besides *Mistletoe*: As in *Syria*, there is an *Herbe* called *Cassytas*, that groweth out of tall *Trees*, and windeth it selfe about the same *Tree* where it groweth; And sometimes about *Thornes*. There is a kinde of *Polypode*, that groweth out of *Trees*, though it windeth not. So likewise an *Herbe* called *Faunos*, vpon the *Wilde Oline*. And an *Herbe* called *Hippophaeton* vpon the *Fullers Thorne*; Which, they say, is good for the *Falling-Sicknesse*.

It hath beene obserued, by some of the *Ancients*, that howsoeuer *Cold* and *Easterly Winds*, are thought to be great *Enemies* to *Fruit*; yet neuerthelesse *South-Winds* are also found to doe *Hurt*; Especially in the *Blossoming* time; And the more, if *Showers* follow. It seemeth, they call forth the *Moisture* too fast. The *West-Winds* are the best. It hath beene obserued also that *Greene* and *Open Winters* doe hurt *Trees*; In so much as if two or three such *Winters* come together, *Almond-Trees*, and some other *Trees*, will dye. The *Cause* is the same with the former, because the *Luft* of the *Earth* ouerspends it selfe; Howsoeuer some other of the *Ancients* haue commended *Warne Winters*.

Snowes, lying long, cause a *Fruitfull Teare*: For first, they keepe in the *Strength* of the *Earth*; Secondly, they water the *Earth*, better than *Raine*; For in *Snow*, the *Earth* doth (as it were) sucke the *Water*, as out of the *Teate*. Thirdly, the *Moisture* of *Snow* is the finest *Moisture*; For it is the *Froth* of the *Cloudy Waters*.

Showers, if they come a little before the *Ripening* of *Fruits*, doe good to all *Succulent* and *Moist Fruits*; As *Vines*, *Olines*, *Pomegranates*; Yet it is rather for *Plentie*, than for *Goodnesse*; For the best *Wines* are in the *Driest Vintages*: *Small Showers* are likewise good for *Corne*, so as
Parching

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Parching Heats come not vpon them. Generally, *Night-Showers* are better than *Day-Showers*; For that the *Sunne* followeth not so fast vpon them: And wee see, euen in *Watring* by the *Hand*, it is best, in *Summer time*, to water in the *Euening*.

665

The *Differences* of *Earths*, and the *Triall* of them, are worthy to be diligently inquired. The *Earth*, that with *Showers* doth easiliest *Soften*, is commended; And yet some *Earth* of that kinde will be very *Dry*, and *Hard* before the *Showers*. The *Earth* that casteth vp from the *Plough*, a *Great Clod*, is not so good, as that which casteth vp a *Smaller Clod*. The *Earth*, that putteth forth *Mosse* easily, and may be called *Mouldy*, is not good. The *Earth*, that smelleth well vpon the *Digging*, or *Plowing*, is commended; As containing the *Iuyce* of *Vegetables* almost already prepared. It is thought by some, that the *Ends* of low *Raine-Bowes*, fall more vpon one kinde of *Earth* than vpon another: As it may well be; For that that *Earth* is most *Roside*: And therefore it is commended for a *Signe* of good *Earth*. The *Poorenesse* of the *Herbs*, (it is plaine,) shew the *Poorenesse* of the *Earth*; And especially if they be in *Colour* more darke: But if the *Herbs* shew *Withered*, or *Blasted* at the *Top*, it sheweth the *Earth* to be very *Cold*: And so doth the *Mossinesse* of *Trees*. The *Earth*, whereof the *Grasse* is soone *Parched* with the *Sunne*, and *Toasted*, is commonly *Forced Earth*, and *Barren* in his owne *Nature*. The *Tender*, *Chefsome*, and *Mellow Earth*, is the best; Being meere *Mould*, betweene the two *Extremes* of *Clay*, and *Sand*; Especially if it be not *Loamy*, and *Binding*. The *Earth*, that after *Raine*, will scarce be *Plowed*, is commonly *Fruitfull*; For it is *Cleaning*, and full of *Iuyce*.

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It is strange, which is obserued by some of the *Ancients*, that *Dust* helpeth the *Fruitfulnessse* of *Trees*; And of *Vines*, by name; In so much as they cast *Dust* vpon them of purpose. It should seeme, that that *Powdring*, when a *Shower* commeth, maketh a kinde of *Soyling* to the *Tree*, being *Earth* and *Water*, finely laid on. And they note, that *Countries*, where the *Fields* and *Wayes* are *Dusty*, beare the best *Vines*.

667

It is commended by the *Ancients*, for an *Excellent Helpe* to *Trees*, to lay the *Stalkes* and *Leaues* of *Lupines* about the *Roots*; Or to *Plow* them into the *Ground*, where you will sowe *Corne*. The *Burning* also of the *Cuttings* of *Vines*, and *Casting* them vpon *land*, doth much *Good*. And it was generally receiued of old, that the *Dunging* of *Grounds*, when the *West Wind* bloweth, and in the *Decrease* of the *Moone*, doth greatly helpe; The *Earth* (as it seemeth) being then more *thirstie*, and open, to receiue the *Dung*.

668

The *Grafting* of *Vines* vpon *Vines*, (as I take it,) is not now in vse: The *Ancients* had it, and that three wayes: The *First* was *Infsion*, which is the *Ordinary Manner* of *Grafting*: The *Second* was *Terebration*, thorow the *Middle* of the *Stocke*, and *Putting* in the *Cions* there: And the *Third* was *Paring* of two *Vines*, that grow together, to the *Marrow*, and *Binding* them close.

669

The *Diseases* and ill *Accidents* of *Corne*, are worthy to be enquired; And

And would be more worthy to be enquired, if it were in Mens Power to helpe them; Whereas many of them are not to be remedied. The *Mildew* is one of the Greatest; which (out of question) commeth by *Closetnesse* of *Aire*; And therefore in *Hills*, or large *Champaigne Grounds*, it seldom commeth; Such as is with vs *Tork's Woold*. This cannot be remedied, otherwise than that in *Countries* of Small Enclosure, the *Grounds* be turned into larger *Fields*: Which I haue knowne to doe good in some *Farmes*. Another *Disease* is the *Putting forth* of *Wilde Oats*, whereinto *Corne* oftentimes, (especially *Barley*) doth degenerate. It happeneth chiefly from the *Weaknesse* of the *Graine* that is sowne; For if it be either too Old, or Mouldy, it will bring forth *Wilde Oats*. Another *Disease* is the *Society* of the *Ground*; For if you sow one *Ground* still with the same *Corne*, (I meane not the same *Corne* that grew vpon the same *Ground*,) but the same *Kinde* of *Graine*; (As *Wheat*, *Barley*, &c.) it will prosper but poorly: Therefore besides the *Resting* of the *Ground*, you must vary the *Seed*. Another ill *Accident* is, from the *Winds*, which hurt at two times; At the *Flouring*, by *Shaking* off the *Flowers*; And at the full *Ripening*, by *Shaking* out the *Corne*. Another ill *Accident* is, *Drouth*, at the *Spindling* of the *Corne*; Which with vs is rare; But in *Hotter Countries*, common: Inmuch as the Word, *Calamitas*, was first deriued from *Calamus*, when the *Corne* could not get out of the *Stalke*. Another ill *Accident* is, *Ouer-wet* at *Sowing-Time*; which with vs breedeth much *Dearth*; Inmuch as the *Corne* neuer commeth vp; And (many times) they are forced to resow *Sommer-Corne*, where they sowed *Winter-Corne*. Another ill *Accident* is *Bitter Frosts*, continued, without *Snow*; Especially in the Beginning of the *Winter*, after the *Seed* is new Sown. Another *Disease* is *Wormes*; which sometimes breed in the *Root*, and happen vpon *Hot Sunnes*, and *Showers*, immediately after the *Sowing*; And another *Worme* breedeth in the *Eare* it Selfe; Especially when *Hot Sunnes* breake often out of *Clouds*. Another *Disease* is *Weeds*; And they are such, as eithet *Choake*, and *Ouer-shadow* the *Corne*, and beare it downe; Or starue the *Corne*, and deceue it of *Nourishment*. Another *Disease* is, *Ouer-Rancknesse* of the *Corne*; Which they vse to remedy, by *Mowing* it after it is come vp; Or putting *Sheepe* into it. Another ill *Accident* is *Laying* of *Corne* with great *Raines*, neare, or in *Harnest*. Another ill *Accident* is, if the *Seed* happen to haue touched *Oyle*, or any *Thing*, that is *Fat*; For those *Substances* haue an *Antipathy* with *Nourishment* of *Water*.

The *Remedies* of the *Diseases* of *Corne* haue beene obserued as followeth. The *Steeping* of the *Graine*, before *Sowing*, a little time in *Wine*, is thought a *Preservative*: The *Mingling* of *Seed-Corne* with *Albes*, is thought to be good; The *Sowing* at the *Wane* of the *Moone*, is thought to make the *Corne* sound: It hath not beene practised, but it is thought to bee of vse, to make some *Miscellane* in *Corne*; As if you sow a few *Beanes* with *Wheat*, your *Wheat* will be the better. It hath beene obserued, that the *Sowing* of *Corne* with *Houfleeke*, doth good. Though *Graine*, that

toucheth *Oile*, or *Fat*, receiueh hurt, yet the *Steeping* of it, in the *Dregs* of *Oile*, when it beginneth to *Putrifie*, (which they call *Amurca*,) is thought to assure it against *Wormes*. It is reported also, that if *Corne* be *Mowed*, it will make the *Graine* Longer, but *Emptier*, and hauing More of the *Huske*.

671 It hath beene noted, that *Seed* of a yeere old, is the Best; And of two or three yeeres is Worse; And that which is more Old, is quite Barren; Though (no doubt) some *Seeds* and *Graines* last better than others. The *Corne*, which in the *Vanning* lieth lowest, is the best; And the *Corne*, which broken or bitten retaineth a little *Yellownesse*, is better than that which is very *White*.

672 It hath beene obserued, that of all *Roots* of *Herbs*, the *Root* of *Sorrell* goeth the furthest into the *Earth*; Inso much as it hath beene knowne to goe three Cubits deepe; And that it is the *Root* that continueth fit (longest) to be set againe, of any *Root* that groweth. It is a *Cold* and *Acide* *Herbe*, that (as it seemeth) loueth the *Earth*, and is not much drawne by the *Sunne*.

673 It hath beene obserued, that some *Herbs* like best, being watred with *Salt-water*; As *Radish*, *Beet*, *Rew*, *Pennyroyall*; This Triall would be extended to some other *Herbs*; Especially such as are Strong; As *Tarragon*, *Mustard-Seed*, *Rocket*, and the like.

674 It is strange that is generally receiued, how some *Poysonous* *Beasts* affect *Odorate* and *Wholesome* *Herbs*; As that the *Snake* loueth *Fennell*; That the *Toad* will be much vnder *Sage*; That *Frogs* will be in *Cinquefoile*. It may be, it is rather the *Shade*, or other *Couerture*, that they take liking in, than the *Vertue* of the *Herbe*.

675 It were a Matter of great Profit, (saue that I doubt it is too Coniecturall to venture vpon,) if one could discern, what *Corne*, *Herbs*, or *Fruits*, are like to be in *Plenty*, or *Scarcity*, by some *Signes* and *Prognosticks*, in the Beginning of the *Yeere*: For as for those, that are like to bee in *Plenty*, they may be bargained for, vpon the *Ground*; As the Old Relation was of *Thales*; who to shew how easie it was for a *Philosopher* to be rich, when he fore-saw a great *Plenty* of *Olines*, made a *Monopoly* of them. And for *Scarcity*, Men may make Profit in keeping better the old Store. Long Continuance of *Snow* is beleued to make a *Fruitfull* *Yeere* of *Corne*: An *Early Winter*, or a very *Late Winter*, a *Barren* *Yeere* of *Corne*: An *Open* and *Serene Winter*, an ill *Yeere* of *Fruit*: These we haue partly touched before: But other *Prognosticks* of like Nature are diligently to be enquired.

676 There seeme to be, in some *Plants*, *Singularities*, wherein they differ from all Other; The *Oline* hath the *Oily Part*, only on the *Outside*; Whereas all other *Fruits* haue it in the *Nut*, or *Kernell*. The *Pirre* hath (in effect) no *Stone*, *Nut*, nor *Kernell*; Except you will count the little *Graines* *Kernels*. The *Pomegranate* and *Pine-Apple* haue onely, amongst *Fruits*, *Graines* distinct in severall *Cells*. No *Herbs* haue *Curled Leanes*, but *Cabbage*, and *Cabbage-Lettuce*. None haue double *Leanes*, one belonging to the

the *Stalke*, another to the *Fruit* or *Seed*, but the *Artichooke*: No *Flower* hath that kinde of Spread that the *Woodbine* hath. This may be a large Field of Contemplation; For it sheweth that in the Frame of *Nature*, there is, in the Producing of some *Species*, a Composition of Matter, which happeneth oft, and may be much diuerfified: In others, such as happeneth rarely, and admitteth little Variety: For so it is likewise in *Beasts*: *Dogs* haue a Resemblance with *Wolues*, and *Foxes*; *Horses* with *Asses*, *Kine* with *Bufles*; *Hares* with *Conies*; &c. And so in *Birds*: *Kites* and *Kestrells* haue a Resemblance with *Hawkes*; *Common-Doues* with *Ring-Doues*, and *Turtles*; *Black-Birds* with *Thrushes* and *Maniffes*; *Crowes* with *Rauens*, *Dawes*, and *Choughes*, &c. But *Elephants*, and *Swine* amongst *Beasts*; And the *Bird of Paradise*, and the *Peacocke* amongst *Birds*; And some few others; haue scarce any other *Species*, that haue Affinity with them.

Wee leaue the Description of *Plants*, and their *Vertues*, to *Herball*s, and other like *Bookes* of *Naturall History*: Wherein *Mens* diligence hath beene great, euen to *Curiosity*: For our *Experiments* are only such, as doe euer ascend a Degree, to the Deriuing of *Causes*, and *Extracting* of *Axiomes*, which, wee are not ignorant, but that some, both of the *Ancient*, and *Moderne Writers*, haue also laboured; But their *Causes*, and *Axiomes*, are so full of *Imagination*, and so infected with the old *Receiued Theories*, as they are meere *Inquinations* of *Experience*, and Concoct it not.

IT hath beene obserued, by some of the *Ancients*, that *Skins*, (especially of *Rams*.) newly pulled off, and applied to the *Wounds* of *Stripes*, doe keepe them from Swelling, and Exulcerating; And likewise Heale them, and Close them vp; And that the *Whites* of *Eggs* doe the same. The Cause, is a Temperate *Conglutination*; For both *Bodies* are Clammy, and Viscous, and doe bridle the *Deflux* of *Humours* to the Hurts, without Penning them in too much.

YOU may turne (almost) all *Flesh* into a *Fatty Substance*, if you take *Flesh*, and cut it into *Peeeces*, and put the *Peeeces* into a *Glas*se couered with *Parchment*; And so let the *Glas*se stand six or seuen *Houres* in *Boyl*ing *Water*. It may be an *Experiment* of Profit, for Making of *Fat*, or *Grease* for many vses; But then it must be of such *Flesh* as is not Edible; As *Horses*, *Dogs*, *Beares*, *Foxes*, *Badgers*, &c.

IT is reported by one of the *Ancients*, that *New Wine*, put into *Vessels* well stopped, and the *Vessels* let downe into the *Sea*, will accelerate very much, the Making of them Ripe and Potable. The same would be tried in *Wort*.

Experiment
Solitary touching
Healing
of Wounds.

677

Experiment
Solitary touching
Fat diffused
in Flesh.

678

Experiment
Solitary touching
Ripening
of Drink before
the Time.

679

Experiment
Solitary tou-
ching *Pilosity*
and *Plumage*.

680

Beast^s are more *Hairy* than *Men*; And *Savage Men* more than *Civill*; And the *Plumage* of *Birds* exceedeth the *Pilosity* of *Beasts*. The Cause of the Smoothnesse in *Men*, is not any Abundance of *Heat*, and *Moisture*, though that indeed causeth *Pilosity*; But there is requisite to *Pilosity*, not so much *Heat* and *Moisture*, as *Excrementitious Heat* and *Moisture*: (For whatsoever assimilateth, goeth not into the *Haire*;) And *Excrementitious Moisture* aboundeth most in *Beasts*, and *Men* that are more *Savage*. Much the same Reason is there of the *Plumage* of *Birds*; For *Birds* assimilate lesse, and exerne more than *Beasts*: For their *Excrements* are ever liquid, and their *Flesh* (generally) more dry: Besides, they have not *Instruments* for *Vrine*; And so all the *Excrementitious Moisture* goeth into the *Feathers*: And therefore it is no Marvell, though *Birds* be commonly better Meat than *Beasts*, because their *Flesh* doth assimilate more finely, and secerneth more subtilly. Again, the *Head* of *Man* hath *Haire* vpon the first Birth, which no other Part of the *Body* hath. The Cause may be Want of *Perspiration*: For Much of the Matter of *Haire*, in the other Parts of the *Body*, goeth forth by Insensible *Perspiration*; And besides, the *Skull* being of a more solid Substance, nourisheth and assimilateth lesse, and exerneth more: And so likewise doth the *Chinne*; We see also that *Haire* commeth not vpon the *Palmes* of the *Hands*, nor *Soales* of the *Feet*; Which are Parts more *Perspirable*. And *Children* likewise are not *Hairy*, for that their *Skins* are more *Perspirable*.

Experiment
Solitary tou-
ching the
Quicknesse of
Motion in
Birds.

681

Birds are of *Swifter Motion* than *Beasts*: For the *Flight* of many *Birds* is *Swifter*, than the *Race* of any *Beasts*. The Cause is, for that the *Spirits* in *Birds*, are in greater Proportion, in comparison of the Bulke of their *Body*, than in *Beasts*: For as for the Reason that some giue, that they are partly Carried, whereas *Beasts* goe, that is Nothing; For by that Reason Swimming should be swifter, than Running: And that Kinde of Carriage also, is not without Labour of the *Wing*.

Experiment
Solitary tou-
ching the differ-
ent Cleerenesse
of the *Sea*.

682

The *Sea* is *Cleerer*, when the *North-wind* bloweth, than when the *South-wind*. The Cause is, for that *Salt-water* hath a little *Oiliness* in the *Surface* thereof; As appeareth in very Hot daies: And againe, for that the *Southerne Wind* relaxeth the *Water* somewhat; As no *Water Boiling* is so Cleere as *Cold Water*.

Experiment
Solitary tou-
ching the differ-
ent Heats of
Fire and *Boiling*
Water.

683

Fire burneth *Wood*, making it first *Luminous*; Then *Blacke* and *Brittle*; And lastly, *Broken* and *Incinerate*: *Scalding Water* doth none of these. The Cause is, for that by *Fire*, the *Spirit* of the *Body* is first *Refined*, & then *Emitted*; Vherof the *Refining*, or *Attenuation* causeth the *Light*; And the *Emission*, first the *Fragility*, and after the *Dissolution* into *Ashes*: Neither doth any other *Body* enter: But in *Water* the *Spirit* of the *Body* is not *Refined* so much; And besides Part of the *Water* entreteth; Which doth increase the *Spirit*, and in a degree extinguish it: Therefore we see that

that *Hot Water* will quench *Fire*. And againe wee see, that in *Bodies*, wherein the *Water* doth not much enter, but only the *Heat* passeth, *Hot Water* worketh the Effects of *Fire*: As in *Egges Boyled*, and *Roasted*, (into which the *Water* entreth not at all) there is scarce difference to be discerned; But in *Fruit*, and *Flesh*, whereinto the *Water* entreth, in some Part, there is much more difference.

THe *Bottom* of a *Vessell* of *Boyling Water*, (as hath beene obserued) is not very much *Heated*; So as Men may put their *Hand* vnder the *Vessell*, and remoue it. The *Cause* is, for that the *Moisture* of *Water*, as it quencheth *Coales*, where it entreth; So it doth allay *Heat*, where it toucheth: And therefore note well, that *Moisture*, although it doth not passe thorow *Bodies*, without *Communication* of some *Substance*, (As *Heat* and *Cold* doe;) yet it worketh manifest Effects; not by Entrance of the *Body*, but by Qualifying of the *Heat*; and *Cold*; As wee see in this *Instance*: And we see likewise, that the *Water* of *Things distilled* in *Water*, (which they call the *Bath*) differeth not much from the *Water* of *Things Distilled* by *Fire*: We see also, that *Pewter-Dishes*, with *Water* in them, will not Melt easily; But without it, they will: Nay we see more, that *Butter*, or *Oyle*, which in themselves are *Inflammable*, yet by Vertue of their *Moisture*, will doe the like.

IT hath beene noted by the *Ancients*, that it is dangerous to Picke ones *Eare*, whilest he *Yawneth*. The *Cause* is, for that in *Yawning*, the *Inner Parchment* of the *Eare* is extended, by the *Drawing* in of the *Spirit*, and *Breath*; For in *Yawning*, and *Sighing* both, the *Spirit* is first strongly Drawne in, and then strongly Expelled.

IT hath beene obserued by the *Ancients*, that *Sneezing* doth cease the *Hiccough*. The *Cause* is, for that the *Motion* of the *Hiccough*, is a *Lifting* vp of the *Stomacke*; which *Sneezing* doth somewhat depresse, and diuert the *Motion* another way. For first we see, that the *Hiccough* commeth of *Fulnesse of Meat*, (especially in *Children*) which causeth an Extension of the *Stomacke*: We see also, it is caused by *Acide Meats*, or *Drinckes*, which is by the *Pricking* of the *Stomacke*: And this *Motion* is ceased, either by *Diuerfion*; Or by *Detention* of the *Spirits*: *Diuerfion*, as in *Sneezing*; *Detention*, as we see *Holding* of the *Breath*, doth helpe somewhat to cease the *Hiccough*: And putting a Man into an Earnest Study doth the like; As is commonly vsed: And *Vinegar* put to the *Nosthrills*, or *Gargarized*, doth it also; For that it is *Astringent*, and inhibiteth the *Motion* of the *Spirits*.

Looking against the *Sunne*, doth induce *Sneezing*. The *Cause* is, not the *Heating* of the *Nosthrills*; For then the *Holding* vp of the *Nosthrills* against the *Sunne*, though one Winke, would doe it; But the *Drawing* downe of the *Moisture* of the *Braine*: For it will make the *Eyes* run with

Experiment
Solitary touching the
Qualification of Heat
by Moisture.

684

Experiment
Solitary touching
Yawning.

685

Experiment
Solitary touching the
Hiccough.

686

Experiment
Solitary touching
Sneezing.

687

Water; And the Drawing of Moisture to the Eyes, doth draw it to the Nosthrils, by Motion of Consent; And so followeth Sneezing; As contrariwise the Tickling of the Nosthrils within, doth draw the Moisture to the Nosthrils, and to the Eyes by Consent; For they also will Water. But yet it hath beene observed, that if one be about to Sneeze, the Rubbing of the Eyes, till they run with Water, will prevent it. Whereof the Cause is, for that the Humour, which was descending to the Nosthrils, is diuer-
ted to the Eyes.

Experiment
Solitary tou-
ching the Ten-
dernesse of the
Teeth.

688

THe Teeth are more, by Cold Drinke, or the like, affected, than the other Parts. The Cause is double: The One, for that the Resistance of Bone to Cold, is greater than of Flesh; for that the Flesh shrinketh, but the Bone resisteth, whereby the Cold becommeth more eager: The Other is, for that the Teeth are Parts without Bloud, Whereas Bloud helpeth to qualifie the Cold: And therefore we see, that the Sinnewes are much affected with Cold; For that they are Parts without Bloud: So the Bones in Sharpe Colds wax Brittle; And therefore it hath beene seene, that all Contusions of Bones, in Hard Weather, are more difficult to Cure.

Experiment
Solitary tou-
ching the
Tongue.

689

IT hath beene noted, that the Tongue receiveth, more easily, Tokens of Diseases, than the other Parts; As of Heats within, which appeare most in the Blacknesse of the Tongue. Againe, Pied Cattell are spotted in their Tongues, &c. The Cause is (no doubt,) the Tendernesse of the Part; which thereby receiveth more easily all Alterations, than any other Parts of the Flesh.

Experiment
Solitary tou-
ching the Taste.

690

WHen the Mouth is out of Taste, it maketh Things taste, sometimes Salt; Chiefly Bitter; And sometimes Loathsome; But neuer Sweet. The Cause is, the Corrupting of the Moisture about the Tongue; Which many times turneth Bitter, and Salt, and Loathsome; But Sweet neuer; For the rest are Degrees of Corruption.

Experiment
Solitary tou-
ching some
Prognosticks of
Pestilentiall
Seasons.

691

IT was observed in the Great Plague of the last Yeere, that there were seene, in diuers Ditches, and low Grounds about London, many Toads, that had Tails, two or three Inches long, at the least: Whereas Toads (vsually) haue no Tails at all. Which argueth a great Disposition to Putrefaction in the Soile, and Aire. It is reported likewise, that Roots, (such as Carrets, and Parsnips,) are more Sweet, and Lushious, in Infectious Yeeres, than in other Yeeres.

Experiment
Solitary tou-
ching Speciall
Simples for
Medicines.

692

WHe Physicians should with all diligence inquire, what Simples Nature yeeldeth, that haue extreme Subtile Parts, without any Mor-
dication, or Acrimony: For they Vndermine that which is Hard; They open that which is Stopped, and Shut; And they expell that which is Offensue, gently, without too much Perturbation. Of this Kinde are Elder-Flowers, which therefore are Proper for the Stone: Of this kinde

is

is the *Dwarfe-Pine*; which is Proper for the *laundies*: Of this kinde is *Harts-Horne*; which is Proper for *Agues*, and *Infections*: Of this kinde is *Piony*; which is Proper for *Stoppings* in the *Head*: Of this kind is *Fumitory*; which is Proper for the *Spleene*: And a Number of Others. Generally, diuers *Creatures* bred of *Putrefaction*, though they be somewhat loathsome to take, are of this kinde; As *Earth-wormes*, *Timber-Sowes*, *Snailles*, &c. And I conceiue, that the *Trochischs* of *Vipers*, (which are so much magnified,) and the *Flesh* of *Snakes* some waies condited, and corrected, (which of late are growne into some *Credite*;) are of the same Nature. So the *Parts* of *Beasts* *Putrified*; (as *Castoreum*, and *Muske*, which haue extreme *Subtill Parts*;) are to be placed amongst them. We see also that *Putrefactions* of *Plants*, (as *Agaricke*, and *Iewes-Eare*;) are of greatest *Vertue*. The *Cause* is, for that *Putrefaction* is the *Subtillest* of all *Motions*, in the *Parts* of *Bodies*: And since we cannot take downe the *Lines* of *Liuing Creatures*, (which some of the *Paracelsians* say (if they could be taken downe,) would make vs *Immortall*;) the Next is for *Subtily* of *Operation*, to take *Bodies* *Putrified*; Such as may be safely taken.

IT hath beene obserued by the *Ancients*, that *Much Vse* of *Venus* doth *Dimme* the *Sight*; And yet *Eunuchs*, which are vnable to generate, are (neuerthelesse) also *Dimme Sighted*. The *Cause* of *Dimnesse of Sight*, in the Former, is the *Expence* of *Spirits*: In the Latter, the *Ouer-moisture* of the *Braine*: For the *Ouer-moisture* of the *Braine* doth thicken the *Spirits* *Visuall*, and obstructeth their *Passages*; As we see by the *Decay*, in the *Sight*, in *Age*; Where also the *Diminution* of the *Spirits* concurrereth as another *Cause*: wee see also that *Blindnesse* commeth by *Rheumes*, and *Cataracts*. Now in *Eunuchs*, there are all the *Notes* of *Moisture*; As the *Swelling* of their *Thighes*, the *Loosenesse* of their *Belly*, the *Smoothnesse* of their *Skinne*, &c.

The *Pleasure* in the *Act* of *Venus* is the the greatest of the *Pleasures* of the *Senses*: The *Matching* of it with *Itch* is vnproper; though that also be *Pleasing* to the touch. But the *Causes* are *Profound*. First, all the *Organs* of the *Senses* qualifie the *Motions* of the *Spirits*; And make so many seuerall *Species* of *Motions*, and *Pleasures* or *Displeasures* thereupon, as there be *Diuerisities* of *Organs*. The *Instruments* of *Sight*, *Hearing*, *Taste*, and *Smell*, are of seuerall frame; And so are the *Parts* for *Generation*. Therefore *Scaliger* doth well, to make the *Pleasure* of *Generation* a *Sixth Sense*; And if there were any other differing *Organs*, and *Qualified Perforations*, for the *Spirits* to passe; there would be more than the *Fine Senses*: Neither doe we well know, whether some *Beasts*, and *Birds*, haue not *Senses* that wee know not: And the very *Sent* of *Dogges* is almost a *Sense* by it selfe. Secondly, the *Pleasures* of the *Touch*, are greater and deeper, than those of the other *Senses*; As we see in *Warming* vpon *Cold*; Or *Refrigeration* vpon *Heat*: For as the *Paines* of the *Touch*, are greater than the *Offences* of other *Senses*; So likewise are the *Pleasures*. It is true, that the *Affecting* of the *Spirits* *immediately*, and (as it were) without an

Organ,

Experiments
in Confort tou-
ching Venus.

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Organ, is of the greatest *Pleasure*; Which is but in two things: *Sweet Smells*; And *Wine*, and the like *Sweet Vapours*. For *Smells*, wee see their great and sudden Effect in fetching *Men* againe, when they swoone: For *Drinke*, it is certain, that the *Pleasure* of *Drunkenesse*, is next the *Pleasure* of *Venus*: And *Great Ioyes* (likewise) make the *Spirits* moue, and touch themselues: And the *Pleasure* of *Venus* is somewhat of the same Kinde.

It hath beene alwayes obserued, that *Men* are more inclined to *Venus* in the *Winter*, and *Women* in the *Summer*. The Cause is, for that the *Spirits*, in a Body more Hot and dry, (as the *Spirits* of *Men* are,) by the *Summer* are more exhaled, and dissipated; And in the *Winter* more condensed, and kept entire: But in *Bodies* that are Cold and Moist, (as *Womens* are,) the *Summer* doth Cherish the *Spirits*, and calleth them forth; the *Winter* doth dull them. Furthermore, the *Abstinence*, or *Intermission* of the Use of *Venus*, in Moist and well Habituare Bodies, breedeth a Number of *Diseases*; And especiall dangerous *Impostumations*. The Reason is euident; For that it is a Principall *Euacuation*, especially of the *Spirits*: For of the *Spirits*, there is scarce any *Euacuation*, but in *Venus*, and *Exercise*. And therefore the *Omission* of either of them, breedeth all *Diseases* of *Repletion*.

Experiments
in Consort;
touching the
Insecta.

The Nature of *Viufication* is very worthy the Enquiry: And as the Nature of *Things*, is commonly better perceiued, in Small, than in Great; and in vnperfect, than in perfect; and in Parts, than in whole: So the Nature of *Viufication* is best enquired in *Creatures* bred of *Putrefaction*. The Contemplation whereof hath many Excellent Fruits. First, in Disclosing the Originall of *Viufication*. Secondly, in Disclosing the Originall of *Figuration*. Thirdly, in Disclosing many *Things* in the Nature of Perfect *Creatures*, which in them lye more hidden. And Fourthly, in Traducing, by way of Operation, some Observations in the *Insecta*, to worke Effects vpon Perfect *Creatures*. Note that the word *Insecta*, agreeth not with the Matter, but we euer vse it for Breuities sake, intending by it *Creatures* bred of *Putrefaction*.

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The *Insecta* are found to breed out of seuerall Matters: Some breed of *Mud*, or *Dung*; As the *Earth-Wormes*, *Eeles*, *Snakes*, &c. For they are both *Putrefactions*: For *Water* in *Mud* doth Putrifie, as not able to Preserve it selfe: And for *Dung*, all Excrements are the Refuse and *Putrefactions* of *Nourishment*. Some breed in *Wood*, both Growing, and Cut down. Quare in what Woods most, and at what Seasons? We see that the *Worms* with many Feet, which round themselues into Balls, are bred chiefly vnder Logs of *Timber*, but not in the *Timber*; And they are said to be found also, (many times,) in *Gardens*, where no Logs are. But it seemeth their

Generation

Generation requireth a *Couerture*, both from *Sunne*, and *Raine*, or *Dew*; As the *Timber* is; And therefore they are not *Venemous*, but (contrariwise) are held by the *Physitians* to clarify the *Bloud*. It is obserued also that *Cimices* are found in the *Holes* of *Bed-Sides*. Some breed in the *Haire* of *Liuing Creatures*; As *Lice*, and *Tikes*; which are bred by the *Sweat* close kept, and somewhat arefied by the *Haire*. The *Excrements* of *Liuing Creatures*, doe not only breed *Insecta*, when they are *Excerned*, but also while they are in the *Body*; As in *Wormes*, whereto *Children* are most subiect, and are chiefly in the *Guts*. And it hath beene lately obserued by *Physitians*, that in many *Pestilent Diseases*, there are *Wormes* found in the vpper Parts of the *Body*, where *Excrements* are not, but only *Humours Putrified*. *Fleas* breed Principally of *Straw* or *Mats*, where there hath beene a little *Moisture*; Or the *Chamber* and *Bed-straw* kept close, and not *Aired*. It is receiued that they are killed by *Strewing Wormewood* in the *Rooms*. And it is truly obserued, that *Butter Things* are apt, rather to kill, than engender *Putrefaction*; And they be *Things*, that are *Fat*, or *Sweet*, that are aptest to *Putrifie*. There is a *Worme*, that breedeth in *Meale*, of the shape of a large white *Magget*, which is giuen as a great *Dainty* to *Nightingales*. The *Moath* breedeth vpon *Cloth*, and other *Lanifices*; Especially if they be laid vp dankish, and wet. It delighteth to be about the *Flame* of a *Candle*. There is a *Worme* called a *Wenill*, bred vnder *Ground*, and that feedeth vpon *Roots*; As *Parsnips*, *Carrots*, &c. Some breed in *Waters*, especially shaded, but they must be *Standing-waters*; As the *Water-Spider*, that hath six *Legs*. The *Fly* called the *Gad-fly*, breedeth of somewhat that *Swimmeth* vpon the *Top* of the *Water*, and is most about *Ponds*. There is a *Worme* that breedeth of the *Dregs* of *Wine Decayed*; which afterwards, (as is obserued by some of the *Ancients*,) turneth into a *Gnat*. It hath bin obserued by the *Ancients*, that there is a *Worme* that breeds in old *Snow*, and is of Colour *Reddish*, and dull of *Motion*, and dieth soone after it commeth out of *Snow*. Which should shew, that *Snow* hath in it a secret *Warmth*; For else it could hard'y *Viuiſie*. And the Reason of the *Dying* of the *Worme*, may be the sudden *Exhaling* of that little *Spirit*, as soone as it commeth out of the *Cold*, which had shut it in. For as *Butterflies* quicken with *Heat*, which were benumbed with *Cold*; So *Spirits* may exhale with *Heat*, which were Preserued in *Cold*. It is affirmed both by *Ancient* and *Moderne Observation*, that in *Furnaces* of *Copper*, and *Brasse*, where *Chalcites*, (which is *Vitrioll*,) is often cast in, to mend the working, there riseth suddenly a *Fly*, which sometimes moueth, as if it tooke hold on the walls of the *Furnace*; Sometimes is seene mouing in the *Fire* below; And dieth presently, as soone as it is out of the *Furnace*. Which is a Noble *Instance*, and worthy to be weighed; for it sheweth that as well *Violent Heat* of *Fire*, as the *Gentle Heat* of *Liuing Creatures*, will *Viuiſie*, if it haue Matter Proportionable. Now the great *Axiome* of *Viuiſication* is, that there must be *Heat* to dilate the *Spirit* of the *Body*; An *Active Spirit* to be dilated; Matter *Viscous* or *Tenacious*, to hold in the *Spirit*; And that Matter to be put forth, and *Figured*. Now a *Spirit* dilated by so ardent a

Fire,

Fire, as that of the *Furnace*, as soone as euer it cooleth neuer so little, congealeth presently. And (no doubt) this *Action* is furthered by the *Chalcites*, which hath a *Spirit*, that will Put forth and germinate, as wee see in *Chymicall* Trialls. Briefly, most *Things Putrified* bring forth *Insecta* of feuerall Names; But wee will not take vpon vs now, to Enumerate them all.

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The *Insecta* haue beene noted by the *Ancients*, to feed little: But this hath not beene diligently obserued; For *Grashoppers* eat vp the *Greene* of whole *Countries*; And *Silke-Wormes* deuoure *Leaues* swiftly; And *Ants* make great Prouision. It is true, that *Creatures*, that Sleepe and rest much, Eat little; As *Dormise*, and *Bats*, &c. They are all without *Blond*: Which may be, for that the *Iuyce* of their *Bodies*, is almost all one; Not *Bloud*, and *Flesh*, and *Skin*, and *Bone*, as in *Perfect Creatures*; The *Integrall Parts* haue Extreme Variety, but the *Similar Parts* little. It is true, that they haue, (some of them,) a *Diaphragme*, and an *Intestine*; And they haue all *Skins*; Which in most of the *Insecta* are cast often. They are not (generally) of *long Life*: Yet *Bees* haue beene knowne to liue seuen yeares: And *Snakes* are thought, the rather for the *Casting* of their *Spoile*, to liue till they be Old: And *Eeles*, which many times breed of *Putrefaction*, will liue and grow very long: And those that Enterchange from *Wormes* to *Flyes* in the *Summer*, and from *Flyes* to *Wormes* in the *Winter*, haue beene kept in Boxes foure yeares at the least. Yet there are certaine *Flyes*, that are called *Ephemera*, that liue but a day. The *Cause* is, the Exility of the *Spirit*; Or perhaps the Absence of the *Sunne*; For that if they were brought in, or kept close, they might liue longer. Many of the *Insecta*, (as *Butterflies*, and other *Flyes*,) reuiue easily, when they seeme dead, being brought to the *Sunne*, or *Fire*. The *Cause* whereof is, the *Diffusion* of the *Vitall Spirit*, and the *Easie Dilating* of it by a little *Heat*. They stirre a good while, after their *Heads* are off, or that they be cut in Peeeces; which is caused also, for that their *Vitall Spirits* are more diffused thorow-out all their *Parts*, and lesse confined to *Organs*, than in *Perfect Creatures*.

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The *Insecta* haue *Voluntary Motion*, and therefore *Imagination*; And whereas some of the *Ancients* haue said, that their *Motion* is Indeterminate, and their *Imagination* Indefinite, it is negligently obserued; For *Ants* goe right forwards to their *Hills*; And *Bees* doe (admirably) know the way, from a Flowry Heath, two or three Miles off, to their *Hiues*. It may be, *Gnats*, and *Flyes*, haue their *Imagination* more mutable, and giddy, as *Small Birds* likewise haue. It is said by some of the *Ancients*, that they haue only the *Sense* of *Feeling*; which is manifestly vntrue: For if they goe forth-right to a Place, they must needs haue Sight: Besides they delight more in one *Flower*, or *Herb*, than in another, and therefore haue *Taste*: And *Bees* are called with *Sound* vpon *Brasse*, and therefore they haue *Hearing*: Which sheweth likewise that though their *Spirit* be diffused, yet there is a *Seat* of their *Senses* in their *Head*.

Other Obseruations concerning the Insecta, together with the Enumeration

tion of them, we referre to that Place, where we meane to handle the Title of Animal's in generall.

A Man Leapeth better with *Weights*, in his *Hands*, than without. The Cause is, for that the *Weight*, (if it be proportionable,) strengthneth the *Sinewes*, by Contracting them. For otherwise, where no *Contraction* is needfull, *Weight* hindereth. As we see in *Horse-Races*, *Men* are curious to fore-see, that there be not the least *Weight*, vpon the one *Horse*, more than vpon the other. In *Leaping* with *Weights*, the *Armes* are first cast backwards, and then forwards, with so much the greater Force: For the *Hands* goe backward before they take their Raise. *Quere*, if the contrary *Motion* of the *Spirits*, immediately before the *Motion* we intend, doth not cause the *Spirits*, as it were, to breake forth with more Force: As *Breath* also drawne, and kept in, commeth forth more forcibly: And in *Casting* of any *Thing*, the *Arms*, to make a greater *Swing*, are first cast backward.

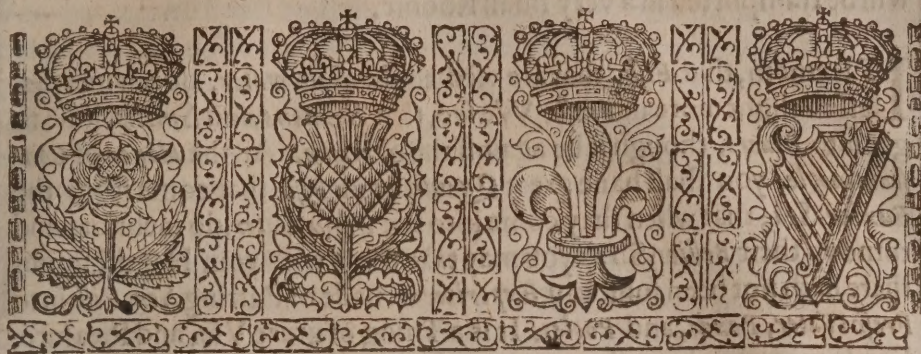
Experiment
Solitary tou-
ching Leaping.

699

OF *Musicall Tones*, and *Vnequall Sounds*, we haue spoken before; But touching the *Pleasure*, and *Displeasure* of the *Senses*, not so fully. *Harsh Sounds*, as of a *Sawe*, when it is sharpened; *Grinding* of one *Stone* against another; *Squeaking*, or *Skrieking Noise*; make a *Shivering* or *Horror* in the *Body*, and set the *Teeth* on edge. The Cause is, for that the *Objects* of the *Eare*, doe affect the *Spirits* (immediately) most with *Pleasure* and *Offence*. We see, there is no *Colour* that affecteth the *Eye* much with *Displeasure*: There be *Sights*, that are *Horrible*, because they excite the *Memory* of *Things* that are *Odiours*, or *Fearfull*; But the same *Things Painted* doe little affect. As for *Smells*, *Tastes*, and *Touches*, they be *Things* that doe affect, by a *Participation*, or *Impulsion* of the *Body*, of the *Object*. So it is *Sound* alone, that doth immediately, and incorporeally, affect most: This is most manifest in *Musicke*; and *Concords* and *Discords* in *Musicke*: For all *Sounds*, whether they be *Sharpe*, or *Flat*, if they be *Sweet*, haue a *Roundnesse* and *Equality*; And if they be *Harsh*, are *Vnequall*: For a *Discord* it selfe is but a *Harshnesse* of *Diuers Sounds Meeting*. It is true, that *Inequality*, not *Stayed* vpon, but *Passing*, is rather an *Encrease* of *Sweetnesse*; As in the *Purling* of a *Wreathed String*; And in the *Rancity* of a *Trumpet*; And in the *Nightingale-Pipe* of a *Regall*; And in a *Discord* straight falling vpon a *Concord*: But if you stay vpon it, it is *Offensive*; And therefore, there be these three *Degrees* of *Pleasing*, and *Displeasing* in *Sounds*; *Sweet Sounds*; *Discords*; and *Harsh Sounds*, which we call by diuers Names, as *Skrieking*, or *Grating*, such as we now speake of. As for the *Setting* of the *Teeth* on *Edge*, we see plainly, what an *Intercourse* there is, betweene the *Teeth*, and the *Organ* of the *Hearing*, by the *Taking* of the *End* of a *Bow*, betweene the *Teeth*, and *Striking* vpon the *String*.

Experiment
Solitary tou-
ching the Plea-
sures, and Dis-
pleasures of the
Senses, especi-
ally of Hearing.

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NATVRALL HISTORIE.

VIII. Century.



Here be *Minerals*, and *Fossiles*, in great Varie-
tie; But of *Veines* of *Earth Medicinall*, but
few; The Chiefe are, *Terra Lemnia*, *Terra*
Sigillata communis, and *Bolus Arminius*:
Whereof *Terra Lemnia* is the Chiefe. The
Vertues of them are, for *Curing* of *Wounds*,
Stanching of *Bloud*, *Stopping* of *Fluxes* and
Rheumes, and *Arresting* the *Spreading* of
Poison, *Infection*, and *Putrefaction*: And they
haue, of all other *Simples*, the *Perfected* and
Purest Quality of *Drying*, with little or no *Mixture* of any other *Quality*.
Yet it is true, that the *Bolus Arminicke* is the most *Cold* of them; And that
Terra Lemnia is the most *Hot*; For which Cause, the *Island Lemnos*, where
it is digged, was in the Old *Fabulous Ages* consecrated to *Vulcan*.

ABout the *Bottom* of the *Straights* are gathered great *Quantities* of
Sponges, which are gathered from the *sides* of *Rocks*, being as it
were a large, but tough, *Mass*. It is the more to be noted, because that
there be but few *Substances*, *Plant-like*, that grow deep within the *Sea*; For
they are gathered sometimes fiteene *Fathom* deep; And when they are

Q

laid

Experiment
Solitary tou-
ching *Veines*
of *Medicinal*
Earth.

701

Experiment
Solitary tou-
ching the
Growth of
Sponges.

702

laid on Shore, they seeme to be of great Bulke; But crushed together, will be transported in a very small Room.

Experiment
Solitary tou-
ching Sea-Fish,
put in Fresh
Waters.

703

IT seemeth, that *Fish*, that are vsed to the *Salt-water*, doe neuerthe-
lesse delight more in *Fresh*. We see, that *Salmons*, and *Smelts*, loue to
get into *Riuers*, though it be against the *Streame*. At the *Blauen* of *Con-*
stantinople, you shall haue great *Quantities* of *Fish* that come from the
Euxine-Sea; that when they come into the *Fresh Water*, do inebriate and
turne vp their *Bellies*; So as you may take them with your Hand. I doubt
there hath not been sufficient *Experiment* made of Putting *Sea-Fish* into
Fresh Water, *Ponds*, and *Pooles*. It is a Thing of great Vse, and Pleasure:
For so you may haue them new at some good distance from the *Sea*:
And besides, it may be, the *Fish* will eat the pleasanter, and may fall to
breed: And it is said that *Colchester Oysters*, which are put into Pits,
where the *Sea* goeth and commeth (but yet so, that there is a *Fresh Wa-*
ter comming also to them, when the *Sea* voideth,) become by that
meanes Fatter, and more Growne.

Experiment
Solitary tou-
ching Attracti-
on by Similitude
of Substance.

704

THe *Turkish-Bow* giueth a very Forcible *Shoot*; Insomuch as it hath
bin known, that the *Arrow* hath pierced a *Steele Target*, or a Peece
of *Brasse* of two Inches thicke: But that which is more strange, the *Ar-*
row, if it be Headed with *Wood*, hath beene knowne to pierce thorow a
Peece of *Wood*, of eight Inches thicke. And it is certaine, that we had
in vse at one time, for *Sea-Fight*, short *Arrowes*, which they called
Sprights, without any other Heads, saue *Wood* sharpned; which were
discharged out of *Muskets*, and would pierce thorow the Sides of *Ships*,
where a *Bullet* would not pierce. But this dependeth vpon one of the
greatest *Secrets* in all *Nature*; Which is, that *Similitude* of *Substance* will
cause *Attraction*, where the Body is wholly freed from the *Motion* of
Gravity: For if that were taken away, *Lead* would draw *Lead*, and *Gold*
would draw *Gold*, and *Iron* would draw *Iron*, without the helpe of the
Load-Stone. But this same *Motion* of *Weight* or *Gravity* (which is a meere
Motion of the *Matter*, and hath no Affinity with the *Forme*, or *Kinde*,)
doth kill the other *Motion*, except it selfe be killed by a violent *Motion*;
As in these *Instances* of *Arrowes*; For then the *Motion* of *Attraction* by
Similitude of *Substance*, beginneth to shew it selfe. But we shall handle
this Point of *Nature* fully in due Place.

Experiment
Solitary tou-
ching certaine
Drinckes in Tur-
key.

705

They haue in *Turkey*, and the *East*, certaine *Confections*, which they
call *Sernets*, which are like to *Candied Conserues*; And are made of
Sugar and *Limon*, or *Sugar* and *Citrons*, or *Sugar* and *Violets*, and some
other *Flowers*; And some Mixture of *Amber* for the more delicate Per-
sons; And those they dissolue in *Water*, and thereof make their *Drinke*,
because they are forbidden *Wine* by their *Law*. But I doe much maruell,
that no *Englishman*, or *Dutchman*, or *German*, doth set vp *Brewing* in *Con-*
stantinople; Considering they haue such Quantity of *Barley*. For as for
the

the generall Sort of *Men*, Frugality may be the Cause of *Drinking Water*; For that it is no small Saving, to pay nothing for ones *Drinke*: But the better Sort mought well be at the Cost. And yet I wonder the lesse at it, because I see *France*, *Italy*, or *Spaine*, haue not taken into vse, *Beere*, or *Ale*; Which (perhaps) if they did, would better both their *Healths*, and their *Complexions*. It is likely it would be Matter of great *Gain* to any, that should begin it in *Turkey*.

IN *Bathing* in *Hot Water*, *Sweat* (neuerthelesse) commeth not in the *Parts* vnder the *Water*. The Cause is; First, for that *Sweat* is a Kind of *Colliquation*. And that Kind of *Colliquation* is not made, either by an *Ouer-Dry Heat*, or an *Ouer-Moist Heat*. For *Ouer-Moisture* doth somewhat extinguish the *Heat*; As wee see that euen *Hot Water* quencheth *Fire*: And *Ouer-Dry Heat* shutteth the *Pores*: And therefore *Men* will sooner *Sweat* couered before the *Sunne*, or *Fire*, than if they stood *Naked*; And *Earthen Bottles*, filled with *Hot Water*, doe prouoke, in *Bed*, a *Sweat* more daintily, than *Brick-bats Hot*. Secondly, *Hot Water*, doth cause *Euaporation* from the *Skin*; So as it spendeth the Matter, in those *Parts* vnder the *Water*, before it issueth in *Sweat*. Again, *Sweat* commeth more plentifully, if the *Heat* be increased by *Degrees*, than if it be greatest at first, or equall. The Cause is, for that the *Pores* are better opened by a *Gentle Heat*, than by a more *Violent*; And by their opening the *Sweat* issueth more abundantly. And therefore *Physitians* may do well, when they prouoke *Sweat* in *Bed*, by *Bottles*, with a *Decoction* of *Sudorifick* *Herbs* in *Hot Water*, to make two *Degrees* of *Heat* in the *Bottles*; And to lay in the *Bed*, the lesse *Heated* first, and after halfe an *Houre* the more *Heated*.

Sweat is *Salt* in Taste; The Cause is, for that, that *Part* of the *Nourishment*, which is *Fresh* and *Sweet*, turneth into *Blond*, and *Flesh*; And the *Sweat* is only that *Part* which is *Separate* and *Exerned*. *Blond* also *Raw* hath some *Saltnesse*, more than *Flesh*; because the *Assimilation* into *Flesh*, is not without a little and subtile *Excretion* from the *Bloud*.

Sweat commeth forth more out of the *Vpper Parts* of the *Body*, than the *Lower*; The Reason is, because those *Parts* are more replenished with *Spirits*; And the *Spirits* are they that put forth *Sweat*: Besides, they are lesse *Fleshy*, and *Sweat* issueth (chiefly) out of the *Parts* that are lesse *Fleshy*, and more *Dry*; As the *Forehead*, and *Breast*.

Men *Sweat* more in *Sleepe*, than *Waking*; And yet *Sleepe* doth rather stay other *Fluxions*, than cause them; As *Rheumes*, *Loosenesse* of the *Body*, &c. The Cause is, for that in *Sleepe*, the *Heat* and *Spirits* doe naturally moue inwards, and there rest. But when they are collected once within, the *Heat* becommeth more *Violent*, and *Irritate*; And thereby expelleth *Sweat*.

Cold Sweats are (many times) *Mortall*, and neere *Death*; And alwaies *Ill*, and *Suspected*; As in *Great Feares*, *Hypochondriacall Passions*, &c. The Cause is, for that *Cold Sweats* come by a *Relaxation* or *Forfaking* of the *Spirits*.

Experiments
in Confort,
touching *Sweat*

706

707

708

709

710

711

Spirits, whereby the *Moisture* of the Body, which *Heat* did keepe firme in the *Parts*, seuereth, and issueth out.

In those *Diseases* which cannot be discharged by *Sweat*, *Sweat* is ill, and rather to be stayed; As in *Diseases* of the *Lungs*, and *Fluxes* of the *Belly*; But in those *Diseases*, which are expelled by *Sweat*, it easeth and lightneth; As in *Agues*, *Pestilences*, &c. The *Cause* is, for that *Sweat* in the Latter Sort is partly *Criticall*, and sendeth forth the *Matter* that offendeth; But in the Former, it either proceedeth from the *Labour* of the *Spirits*, which sheweth them Oppressed; Or from *Motion* of *Consent*, when *Nature* not able to expell the *Disease*, where it is seated, moueth to an *Expulsion* indifferent ouer all the *Body*.

Experiment
Solitary touch-
ing the Glo-
worme.

712

THe *Nature* of the *Glo-worme* is hitherto not well obserued. Thus much we see; That they breed chiefly in the *Hottest Months* of *Summer*; And that they breed not in *Champaigne*, but in *Bushes*, and *Hedges*. Whereby it may be conceiued, that the *Spirit* of them is very fine, and not to be refined, but by *Summer Heats*: And againe, that by reason of the Fineness, it doth easily exhale. In *Italy*, and the *Hotter Countries*, there is a *Fly* they call *Lucciole*, that shineth as the *Glo-worme* doth; And it may be is the *Flying Glo-worme*. But that *Fly* is chiefly vpon *Fens*, and *Marrishes*. But yet the two former *Observations* hold; For they are not seene, but in the *Heat* of *Summer*; And *Sedge*, or other *Greene* of the *Fens*, giue as good *Shade*, as *Bushes*. It may be the *Glo-wormes* of the *Cold Countries* ripen not so farre as to be *Winged*.

Experiments
in Consort,
touching the
Impressions,
which the *Passions* of the
Minde make
vpon the *Body*.

713

THe *Passions* of the *Minde*, worke vpon the *Body* the *Impressions* following. *Feare* causeth *Palenesse*; *Trembling*; The *Standing* of the *Haire* vpright; *Starting*; and *Skritchings*. The *Palenesse* is caused, for that the *Blond* runneth inward, to succour the *Heart*. The *Trembling* is caused, for that through the *Flight* of the *Spirits* inward, the *Outward Parts* are destituted, and not sustained. *Standing Vpright* of the *Haire* is caused, for that by the *Shutting* of the *Pores* of the *Skin*, the *Haire* that lyeth a-sloap, must needs Rise. *Starting* is both an *Apprehension* of the *Thing feared*; (And, in that kinde, it is a *Motion* of *Shrinking*;) And likewise an *Inquisition*, in the beginning, what the *Matter* should be; (And in that kinde it is a *Motion* of *Erection*;) And therefore, when a *Man* would listen suddenly to any *Thing*, he *Starteth*; For the *Starting* is an *Erection* of the *Spirits* to attend. *Skitching* is an *Appetite* of *Expelling* that which suddenly striketh the *Spirits*: For it must be noted, that many *Motions*, though they be vnprofitable to expell that which hurteth, yet they are *Offers* of *Nature*, and cause *Motions* by *Consent*; As in *Groaning*, or *Crying* vpon *Paine*.

714

Griefe and *Paine* cause *Sighing*; *Sobbing*; *Groaning*; *Screaming*; and *Roaring*; *Teares*; *Distorting* of the *Face*; *Grinding* of the *Teeth*; *Sweating*. *Sighing* is caused by the *Drawing* in of a greater *Quantity* of *Breath* to refresh the *Heart* that laboureth: like a great *Draught* when one is thirsty.

Sobbing

Sobbing is the same Thing stronger. *Groaning*, and *Screaming*, and *Roaring*, are caused by an *Appetite* of *Expulsion*, as hath beene said: For when the *Spirits* cannot expell the Thing that hurteth, in their Strife to do it, by *Motion* of *Consent*, they expell the *Voice*. And this is, when the *Spirits* yeeld, and giue ouer to resist; For if one doe constantly resist *Paine*, he will not groane. *Tearcs* are caused by a *Contraction* of the *Spirits* of the *Braine*; Which *Contraction* by consequence astringeth the *Moisture* of the *Braine*, and thereby sendeth *Tearcs* into the *Eyes*. And this *Contraction*, or *Compression* causeth also *Wringing* of the *Hands*; For *Wringing* is a *Gesture* of *Expression*, of *Moisture*. The *Distorting* of the *Face* is caused by a *Contention*, first to beare and resist, and then to expell. Which maketh the *Parts* knit first, and afterwards open. *Grinding* of the *Teeth* is caused (likewise) by a *Gathering* and *Serring* of the *Spirits* together to resist; Which maketh the *Teeth* also to set hard one against another. *Sweating* is also a *Compound Motion* by the *Labour* of the *Spirits*, first to resist, and then to expell.

Ioy causeth a *Chearefulnessse*, and *Vigour* in the *Eyes*; *Singing*; *Leaping*; *Dancing*; And sometimes *Tearcs*. All these are the *Effects* of the *Dilatation*, and *Comming* forth of the *Spirits* into the *Outward Parts*; Which maketh them more *Liely*, and *Stirring*. We know it hath beene seene, that *Excessive Sudden Ioy*, hath caused *Present Death*, while the *Spirits* did spread so much, as they could not retire againe. As for *Tearcs*, they are the *Effects* of *Compression* of the *Moisture* of the *Braine*, vpon *Dilatation* of the *Spirits*. For *Compression* of the *Spirits* worketh an *Expression* of the *Moisture* of the *Braine*, by *Consent*, as hath beene said in *Griefe*. But then in *Ioy*, it worketh it diuersly; viz. by *Propulsion* of the *Moisture*, when the *Spirits* dilate, and occupy more *Roome*.

Anger causeth *Palenesse* in some, and the *Going* and *Comming* of the *Colour* in Others: Also *Trembling* in some; *Swelling*; *Foaming* at the *Mouth*; *Stamping*; *Bending* of the *Fist*. *Palenesse*, and *Going*, and *Comming* of the *Colour*, are caused by the *Burning* of the *Spirits* about the *Heart*; Which to refresh themselues call in more *Spirits* from the *Outward Parts*. And if the *Palenesse* be alone, without *Sending forth* the *Colour* againe, it is commonly ioyned with some *Feare*; But in many there is no *Palenesse* at all, but contrariwise *Rednesse* about the *Cheekes*, and *Gills*; Which is by the *Sending forth* of the *Spirits* in an *Appetite* to *Reuenge*. *Trembling* in *Anger* is likewise by a *Calling* in of the *Spirits*; And is commonly, when *Anger* is ioyned with *Feare*. *Swelling* is caused, both by a *Dilatation* of the *Spirits* by *Over-Heating*, and by a *Liquefaction* or *Boyling* of the *Humours* thereupon. *Foaming* at the *Mouth* is from the same *Cause*, being an *Ebullition*. *Stamping*, and *Bending* of the *Fist*, are caused by an *Imagination* of the *Act* of *Reuenge*.

Light Displeasure or *Dislike*, causeth *Shaking* of the *Head*; *Frowning*, and *Knitting* of the *Browes*. These *Effects* arise from the same *Causes* that *Trembling*, and *Horror* doe; Namely, from the *Retiring* of the *Spirits*, but in a lesse degree. For the *Shaking* of the *Head* is but a *Slow* and

Definite

Definite Trembling; And is a Gesture of Slight Refusal: And we see also, that a Dislike causeth (often) that Gesture of the Hand, which wee use when we refuse a Thing, or warne it away. The Frowning, and Knitting of the Browes, is a Gathering, or Serring of the Spirits, to resist in some Measure. And we see also, this Knitting of the Browes will follow vpon earnest Studying, or Cogitation of any Thing, though it bee without Dislike.

718

Shame causeth Blushing; And Casting downe of the Eyes. Blushing is the Resort of Bloud to the Face; Which in the Passion of Shame is the Part that laboureth most. And although the Blushing will be seene in the whole Breast, if it be Naked, yet that is but in Passage to the Face. As for the Casting downe of the Eyes, it proceedeth of the Reuerence a Man beareth to other Men; Whereby, when he is ashamed, he cannot endure to looke firmly vpon Others: And we see that Blushing, and the Casting downe of the Eyes both, are more when we come before Many; *Ore Pompeij quid mollius? Nunquam non coram pluribus erubuit.* And likewise when we come before Great, or Reuerend Persons.

719

Pity causeth sometimes Teares; And a Flexion or Cast of the Eye aside. Teares come from the same Cause that they doe in Griefe; for Pity is but Griefe in Anothers Behalfe. The Cast of the Eye is a Gesture of Aversion, or Lothnesse to behold the Object of Pity.

720

Wonder causeth Astonishment, or an Immoveable Posture of the Body; Casting vp of the Eyes to Heauen; And Lifting vp of the Hands. For Astonishment, it is caused by the Fixing of the Minde vpon one Object of Cogitation, whereby it doth not spaciare and transcurre, as it useth; For in Wonder the Spirits fly not, as in Feare; But onely settle, and are made lesse apt to moue. As for the Casting vp of the Eyes, and Lifting vp of the Hands, it is a Kinde of Appeals to the Deity; Which is the Author, by Power, and Providence, of Strange Wonders.

721

Laughing causeth a Dilatation of the Mouth, and Lips; A Continued Expulsion of the Breath, with the loud Noise, which maketh the Interjection of Laughing; Shaking of the Breast, and Sides; Running of the Eyes with Water, if it be Violent, and Continued. Wherein first it is to be vnderstood, that Laughing is scarce (properly) a Passion, but hath his Source from the Intellect; For in Laughing there euer precedeth a Concoit of somewhat Ridiculous. And therefore it is Proper to Man. Secondly, that the Cause of Laughing is but a Light Touch of the Spirits, and not so deepe an Impression as in other Passions. And therefore (that which hath no Affinity with the Passions of the Minde,) it is moued, and that in great vehemency, onely by Tickling some Parts of the Body: And we see that Men euen in a Griued State of Minde, yet cannot sometimes forbear Laughing. Thirdly, it is euer ioyned with some Degree of Delight: And therefore Exhilaration hath some Affinity with Ioy, though it be a much Lighter Motion: *Res seruata est verum Gaudium.* Fourthly, that the Object of it is Deformity, Absurdity, Shrew'd Turnes, and the like. Now to speake of the Causes of the Effects before mentioned, whereunto these

Generall

Generall Notes giue some Light. For the Dilatation of the Mouth and Lips, Continued Expulsion of the Breath and Voice, and Shaking of the Brest and Sides, they proceed (all) from the Dilatation of the Spirits; Especially being Sudden. So likewise, the Running of the Eyes with Water, (as hath beene formerly touched, where we spake of the Teares of Ioy and Griefe,) is an Effect of Dilatation of the Spirits. And for Suddenesse, it is a great Part of the Matter: For we see, that any Shrew'd Turne that ligheth vpon Another; Or any Deformitie, &c. moueth Laughter in the Instant; Which after a little time it doth not. So we cannot Laugh at any Thing after it is Stale, but whilest it is New: And euen in Tickling, if you Tickle the Sides, and giue warning; Or giue a Hard or Continued Touch, it doth not moue Laughter so much.

Lust causeth a Flagrancie in the Eyes; and Priapisme. The Cause of both these is, for that in Lust, the Sight, and the Touch, are the Things desired: And therefore the Spirits resort to those parts, which are most affected. And note well in generall, (For that great Vse may be made of the Observation,) that (euermore) the Spirits, in all Passions, resort most to the Parts, that labour most, or are most affected. As in the last, which hath beene mentioned, they resort to the Eyes, and Venerous Parts: In Feare, and Anger, to the Heart: In Shame to the Face: And in Light Dislikes to the Head.

IT hath beene obserued by the Ancients, and is yet beleeued, that the Sperme of Drunken Men is Vnfruitfull. The Cause is, for that it is Overmoistened, and wanteth Spissitude. And wee haue a merry Saying, that they that goe Drunke to Bed, get Daughters.

Drunken Men are taken with a plaine Defect, or Destitution in Voluntary Motion. They Reele; They tremble; They cannot stand, nor speake strongly. The Cause is, for that the Spirits of the Wine, oppresse the Spirits Animall, and occupate Part of the Place, where they are; And so make them Weake to moue. And therefore Drunken Men are apt to fall asleepe: And Opiates, and Stupefactiues, (as Poppie, Henbane, Hemlocke, &c.) induce a kinde of Drunkenesse, by the Grossenesse of their Vapour; As Wine doth by the Quantitie of the Vapour. Besides, they rob the Spirits Animall of their Matter, whereby they are nourished: For the Spirits of the Wine prey vpon it, as well as they: And so they make the Spirits lesse Supple, and Apt to moue.

Drunken Men imagine euery Thing turnesh round; They imagine also that Things Come vpon them; They See not well Things a farre off; Those Things that they See neare hand, they See out of their Place; And (sometimes) they see Things double. The Cause of the Imagination that Things turne Round, is, for that the Spirits themselues turne, being compressed by the Vapour of the Wine: (For any Liquid Body vpon Compression, turneth, as we see in Water:.) And it is all one to the Sight, whether the Visuall Spirits moue, or the Object moueth, or the Medium moueth. And we see that long Turning Round breedeth the same Imagination.

The

722

Experiments
in Consort touching Drunken-
nesse.

723

724

725

The Cause of the Imagination that *Things come vpon them*, is, for that the *Spirits Visuall* themselves draw backe; which maketh the *Obiect* seeme to come on; And besides, when they see *Things* turne Round, and Moue, *Fear* maketh them thinke they come vpon them. The Cause that they cannot see *Things a farre off*, is the *Weaknesse* of the *Spirits*; for in euery *Megrim*, or *Vertigo*, there is an *Obtenebration* ioyned with a Semblance of *Turning round*; Which we see also in the lighter Sort of *Swoonings*. The Cause of *Seeing things out of their Place*, is the *Refraction* of the *Spirits Visuall*; For the *Vapour* is as an *Vnequall Medium*; And it is, as the Sight of *Things*, out of place, in *Water*. The Cause of *Seeing Things double*, is, the *Swift* and *Vnquiet Motion* of the *Spirits*, (being Oppressed,) to and fro; For, (as was said before,) the *Motion* of the *Spirits Visuall*, and the *Motion* of the *Obiect*, make the same *Appearances*; And for the *Swift Motion* of the *Obiect*, we see, that if you fillip a *Lute-String*, it sheweth double, or Treble.

726

Men are sooner *Drunke* with *Small Draughts*, than with *Great*. And againe, *Wine Sugred* inebriateth lesse, than *Wine Pure*. The Cause of the Former is, for that the *Wine* descendeth not so fast to the *Bottom* of the *Stomach*; But maketh longer Stay in the *Vpper Part* of the *Stomach*, and sendeth *Vapours* faster to the *Head*; And therefore inebriateth sooner. And, for the same Reason, *Sops* in *Wine*, (Quantitie for Quantie,) inebriate more, than *Wine* of it selfe. The Cause of the Latter is, for that the *Sugar* doth inspissate the *Spirits* of the *Wine*, and maketh them not so easie to resolue into *Vapour*. Nay further, it is thought, to be some Remedie against *Inebriating*, if *Wine Sugred* be taken after *Wine Pure*. And the same Effect is wrought either by *Oyle*, or *Milke*, taken vpon much *Drinking*.

Experiment
Solitary touching the
Helpe or Hurt of *Wine*,
though Moderately vsed.

727

The Use of *Wine*, in *Drie*, and *Consumed Bodies*, is hurtfull; In *Moist*, and *Full Bodies*, it is good. The Cause is, for that the *Spirits* of the *Wine* do prey vpon the *Dew*, or *Radicall Moisture*, (as they terme it) of the *Bodie*, and so deceiue the *Animall Spirits*. But where there is *Moisture* Enough, or *Superfluous*, there *Wine* helpeth to digest, and delicates the *Moisture*.

Experiment
Solitary touching
Caterpillers.

728

The *Caterpillar* is one of the most Generall of *Wormes*, and breedeth of *Dew*, and *Leaves*: For we see infinite Number of *Caterpillers*, which breed vpon *Trees*, and *Hedges*; By which the *Leaves* of the *Trees*, or *Hedges*, are in great Part consumed; As well by their Breeding out of the *Leafe*, as by their Feeding vpon the *Leafe*. They breed in the *Spring* chiefly, because then there is both *Dew*, and *Leafe*. And they breed commonly when the *East Winds* haue much blowne: The Cause whereof is, the *Driness* of that *Wind*: For to all *Vinification* vpon *Putrefaction*, it is requisite the *Matter* be not too *Moist*: And therefore we see, they haue *Copwebs* about them, which is a signe of a *Slimy Driness*: As we see vpon the *Ground*, whereupon, by *Dew*, and *Sunne*, *Copwebs* breed all ouer. We

We see also the *Greene Catterpillar* breedeth in the Inward Parts of *Roses*, especially not blowne, where the *Dew* sticketh: But especially *Catterpillers*, both the greatest, and the most, breed vpon *Cabbages*, which haue a *Fat Lease*, and apt to *Putrifie*. The *Catterpillar* towards the *End* of *Summer* waxeth *Volatile*, and turneth to a *Butterfly*, or perhaps some other *Fly*. There is a *Catterpillar*, that hath a *Furre*, or *Downe* vpon him, and seemeth to haue *Affinitie* with the *Silke-worme*.

THe *Flyes Cantharides* are bred of a *Worme*, or *Catterpillar*, but peculiar to certaine *Fruit-Trees*; As are the *Fig-tree*, the *Pine-tree*, and the *Wilde Briar*; All which beare *Sweet Fruit*; And *Fruit* that hath a kinde of secret *Biting*, or *Sharpnesse*: For the *Fig* hath a *Milke* in it, that is *Sweet*, and *Corrosiue*: The *Pine-Apple* hath a *Kernell* that is *Strong* and *Abstersiue*: The *Fruit* of the *Briar* is said to make *Children*, or those that Eat them, *Scabbed*. And therefore, no maruell though *Cantharides* haue such a *Corrosiue*, and *Canterizing Qualitie*; For there is not any other of the *Insecta*, but is bred of a *Duller Matter*. The *Body* of the *Cantharides* is bright coloured; And it may be, that the delicate-coloured *Dragon-Flyes*, may haue likewise some *Corrosiue Qualitie*.

Lassitude is remedied by *Bathing*, or *Annointing* with *Oyle*, and *Warmed Water*. The *Cause* is, for that all *Lassitude* is a kinde of *Contusion*, and *Compression* of the *Parts*; And *Bathing*, and *Annointing* giue a *Relaxation*, or *Emolition*: And the *Mixture* of *Oyle*, and *Water*, is better than either of them alone; Because *Water* Entreth better into the *Pores*, and *Oyle* after *Entry* softneth better. It is found also that the *Taking* of *Tobacco* doth helpe and discharge *Lassitude*. The *Reason* whereof is, partly, because by *Chearing* or *Comforting* of the *Spirits*, it openeth the *Parts Compressed*, or *Contused*: And chiefly, because it refresheth the *Spirits* by the *Opiate Vertue* thereof; And so dischargeth *Wearinesse*; as *Sleepe* likewise doth.

In *Going up a Hill*, the *Knees* will be most *Weary*; In *Going downe a Hill*, the *Thighes*. The *Cause* is, for that, in the *Lift* of the *Feet*, when a Man *Goeth up the Hill*, the *Weight* of the *Body* beareth most vpon the *Knees*; And in *Going downe the Hill*, vpon the *Thighes*.

THe *Casting* of the *Skin*, is by the *Ancients* compared, to the *Breaking* of the *Secundine*, or *Call*; but not rightly: For that were to make euery *Casting* of the *Skin* a *New Birth*: And besides, the *Secundine* is but a generall *Couer*, not shaped according to the *Parts*; But the *Skin* is shaped according to the *Parts*. The *Creatures*, that cast their *Skin*, are; The *Snake*, the *Viper*, the *Grasshopper*, the *Lizard*, the *Silke-worme*, &c. Those that cast their *Shell*, are; The *Lobster*, the *Crab*, the *Crawfish*, the *Hodmandod* or *Dodman*, the *Tortoise*, &c. The *Old Skinned* are found, but the *Old Shells* neuer: So as it is like, they scale off, and crumble away by degrees. And they are knowne, by the *Extreme Tendernesse* and *Softnesse* of

Experiment
Solitary, touching the *Flyes Cantharides*.

729

Experiments
in Consort, touching *Lassitude*.

730

731

Experiment
Solitary touching the *Casting* of the *Skin*, and *Shell*, in some *Creatures*.

732

of the *New Shell*; And sometimes by the *Freshnesse* of the *Colour* of it. The *Cause* of the *Casting* of *Skin*, and *Shell*, should seeme to be the great *Quantitie* of *Matter* in those *Creatures*, that is fit to make *Skin*, or *Shell*; And againe, the *Loosenesse* of the *Skin*, or *Shell*, that sticketh not close to the *Flesh*. For it is certaine, that it is the *New Skin*, or *Shell*, that putteth off the *Old*: So we see, that in *Deere*, it is the *Young Horne*, that putteth off the *Old*; And in *Birds*, the *Young Feathers* put off the *Old*: And so *Birds*, that haue much *Matter* for their *Beake*, cast their *Beakes*; the *New Beake* Putting off the *Old*.

Experiments
in Confort,
touching the
Postures of the
Bodie.

733

Lying, not *Erect*, but *Hollow*, which is in the Making of the Bed; Or with the *Legs gathered up*, which is in the Posture of the Body, is the more *Wholesome*. The *Reason* is, the better *Comforting* of the *Stomach*, which is by that lesse *Penfile*: And we see, that in *Weake Stomachs*, the Laying vp of the *Legs* high, and the *Knees* almost to the *Mouth*, helpeth, and comforteth. We see also that *Gally-Slaves*, notwithstanding their *Misery* otherwise, are commonly *Fat* and *Fleshy*; And the *Reason* is, because the *Stomach* is supported somewhat in *Sitting*; And is *Penfile* in *Standing*, or *Going*. And therefore, for *Prolongation* of *Life*, it is good to choose those *Exercises*, where the *Limbes* moue more than the *Stomach*, and *Belly*; As in *Rowing*, and in *Sawing* being *Seet*.

734

Megrims and *Giddinesse* are rather when we *Rise*, after long *Sitting*, than while we *Sit*. The *Cause* is, for that the *Vapours*, which were gathered by *Sitting*, by the *Sudden Motion*, fly more vp into the *Head*.

735

Leaning long vpon any *Part* maketh it *Numme*, and, as wee call it, *Asleepe*. The *Cause* is, for that the *Compression* of the *Part* suffereth not the *Spirits* to haue free *Accesse*; And therefore, when wee come out of it, wee feele a *Stinging*, or *Pricking*; Which is the *Re-entrance* of the *Spirits*.

Experiment
Solitary tou-
ching *Pestilen-
tian* *Yeares*.

736

IT hath beene noted, that those *Yeares* are *Pestilentiall*, and *Vnwhole-
some*, when there are great *Numbers* of *Frogs*, *Flies*, *Locusts*, &c. The *Cause* is plaine; For that those *Creatures* being engendred of *Putrefaction*, when they abound, shew a generall *Disposition* of the *Teare*, and *Con-
stitution* of the *Aire*, to *Diseases* of *Putrefaction*. And the same *Prognos-
ticke*, (as hath beene said before,) holdeth, if you finde *Wormes* in *Oake-
Apples*. For the *Constitution* of the *Aire*, appeareth more subtilly, in any
of these *Things*, than to the *Sense* of *Man*.

Experiment
Solitary, tou-
ching the *Prog-
nostickes* of *Hard
Winters*.

737

IT is an *Obseruation* amongst *Country-People*, that *Yeares* of *Store* of *Haws* and *Heps*, do commonly portend *Cold Winters*; And they ascribe it to *Gods Providence*, that, (as the *Scripture* saith) reacheth euen to the *Falling* of a *Sparrow*; And much more is like to reach to the *Preservati-
on* of *Birds* in such *Seasons*. The *Naturall Cause* also may be the *Want* of *Heat*, and *Abundance* of *Moisture*, in the *Summer* precedent; Which putteth forth those *Fruits*, and must needs leaue great *Quantitie* of *Cold Va-
pours*,

pours, not dissipate; Which causeth the Cold of the Winter following.

They haue in *Turkey*, a *Drinke* called *Coffa*, made of a *Berry* of the same Name, as Blacke as *Soot*, and of a *Strong Sent*, but not *Aromaticall*; Which they take, beaten into Powder, in *Water*, as Hot as they can drinke it: And they take it, and sit at it, in their *Coffa-Houses*, which are like our *Tauernes*. This *Drinke* comforteth the *Braine*, and *Heart*, and helpeth *Disgestion*. Certainly this *Berry Coffa*; The *Root*, and *Leafe Betel*; The *Leafe Tobacco*; And the *Teare of Poppy*, (*Opium*,) of which the *Turkes* are great Takers, (supposing it expelleth all Feare;) doe all Condense the *Spirits*, and make them Strong, and Aleger. But it seemeth they are taken after seuerall manners; For *Coffa* and *Opium* are taken downe; *Tobacco* but in *Smoake*; And *Betel* is but champed in the *Mouth*, with a little *Lime*. It is like there are more of them, if they were well found out, and well corrected. *Quere* of *Henbane-Seed*; Of *Mandrake*; Of *Saffron*, *Root*, and *Flower*; Of *Folium Indum*; Of *Amber-grice*; Of the *Assyrian Amomum*, if it may be had; And of the *Scarlet Powder*, which they call *Kermex*; And (generally) of all such Things, as doe inebriate, and prouoke *Sleepe*. Note that *Tobacco* is not taken in *Root*, or *Seed*, which are more forcible euer than *Leaues*.

The *Turkes* haue a *Blacke Powder*, made of a *Minerall* called *Alcohole*; Which with a fine long *Pencill* they lay vnder their *Eye-lids*; Which doth colour them Blacke; Whereby the *White* of the *Eye* is set off more *White*. With the same *Powder* they colour also the *Haires* of their *Eye-lids*, and of their *Eye-browes*, which they draw into Embowed *Arches*. You shall finde that *Xenophon* maketh Mention, that the *Medes* vsed to paint their *Eyes*. The *Turkes* vse with the same *Tincture*, to colour the *Haire* of their *Heads* and *Beards* Blacke: And diuers with vs, that are growne *Gray*, and yet would appeare *Young*, finde meanes to make their *Haire* blacke, by Combing it, (as they say,) with a *Leaden Combe*, or the like. As for the *Chineses*, who are of an ill Complexion, (being *Oliuaster*,) they paint their *Cheekes* *Scarlet*; Especially their *King*, and *Grandes*. Generally, *Barbarous People*, that goe *Naked*, doe not only paint Themselves, but they pounce and raze their *Skinne*, that the *Painting* may not be taken forth. And make it into *Worke*s. So doe the *West Indians*; And so did the Ancient *Picts*, and *Brittons*; So that it seemeth, *Men* would haue the *Colours* of *Birds Feathers*, if they could tell how; Or at least, they will haue *Gay Skins*, in stead of *Gay Cloathes*.

It is strange, that the *Vse* of *Bathing*, as a Part of *Diet*, is left. With the *Romans*, and *Grecians*, it was as vsuall, as *Eating*, or *Sleeping*: And so is it amongst the *Turkes* at this day: Whereas with vs it remaineth but as a Part of *Physicke*. I am of Opinion, that the *Vse* of it, as it was with the *Romans*, was hurtfull to Health; For that it made the *Body* Soft, and easie to Waste. For the *Turkes* it is more proper, because that their *Drinking*

Experiment
Solitary touching
Medicines that Con-
dense, and Re-
leue the Spirits.

738

Experiment
Solitary touch-
ing Paintings
of the Body.

739

Experiment
Solitary touch-
ing the Vse
of Bathing and
Annoyning.

740

king Water, and *Feeding* vpon *Rize*, and other Food of small Nourishment, maketh their *Bodies* so Solide, and Hard, as you need not feare that *Bathing* should make them *Froathie*. Besides, the *Turkes* are great *Sitters*, and seldome walke; Whereby they Sweat lesse, and need *Bathing* more. But yet certaine it is, that *Bathing*, and especially *Annoining*, may be so vsed, as it may be a great Helpe to *Health*, and *Prolongation* of *Life*. But hereof we shall speake in due Place, when we come to handle *Experiments Medicinall*.

Experiment
Solitary tou-
ching *Chamo-*
letting of *Paper*.

741

THe *Turkes* haue a Pretty Art of *Chamoletting* of *Paper*, which is not with vs in vse. They take diuers *Oyled Colours*, and put them seuerally (in drops) vpon *Water*; And stirre the *Water* lightly; And then wet their *Paper*, (being of some Thicknesse,) with it; And the *Paper* will be Waued, and Veined, like *Chamolet*, or *Marble*.

Experiment
Solitary tou-
ching *Cuttle-*
Inke.

742

IT is somewhat strange, that the *Bloud* of all *Birds*, and *Beasts*, and *Fishes*, should be of a *Red Colour*, and only the *Bloud* of the *Cuttle* should be as *Blacke* as *Inke*. A Man would thinke, that the *Cause* should be the *High Concoction* of that *Bloud*; For we see in ordinary *Puddings*, that the *Boyling* turneth the *Bloud* to be *Blacke*; And the *Cuttle* is accounted a delicate *Meat*, and is much in Request.

Experiment
Solitary tou-
ching *Encrease*
of *weight* in
Earth.

743

IT is reported of Credit, that if you take *Earth*, from Land adioyning to the *Riuer* of *Nile*; And preserue it in that manner, that it neither come to be Wet, nor Wasted; And Weigh it daily, it will not alter *Weight* untill the seuenteenth of *Iune*, which is the Day when the *Riuer* beginneth to rise; And then it will grow more and more *Ponderous*, till the *Riuer* commeth to his Heighth. Which if it be true, it cannot be caused, but by the *Aire*, which then beginneth to Condense; And so turneth within that Small *Mould* into a degree of *Moisture*; Which produceth *Weight*. So it hath bin obserued, that *Tobacco*, Cut, and Weighed, and then Dried by the Fire, loseth *Weight*; And after being laid in the open *Aire*, recouereth *Weight* againe. And it should seeme, that as soone as euer the *Riuer* beginneth to increase, the whole *Body* of the *Aire* thereabouts suffereth a Change: For (that which is more strange,) it is credibly affirmed, that vpon that very Day, when the *Riuer* first riseth, great *Plagues*, in *Cairo*, vse suddenly to breake vp.

Experiments
in Consort,
touching
Sleepe.

744

THose that are very *Cold*, and especially in their *Feet*, cannot get to *Sleepe*. The *Cause* may be, for that in *Sleepe* is required a *Free Respiration*, which *Cold* doth shut in, and hinder: For wee see, that in great *Colds*, one can scarce draw his *Breath*. Another *Cause* may be, for that *Cold* calleth the *Spirits* to succour; And therefore they cannot so well close, and goe together in the *Head*; Which is euer requisite to *Sleepe*. And for the same *Cause*, *Paine*, and *Noise* hinder *Sleepe*; And *Darknesse* (contrariwise) furthereth *Sleepe*.

Some

Some *Noises* (wherof wee spake in the 112. *Experiment*) helpe *Sleepe*; As the *Blowing* of the *Wind*, the *Trickling* of *Water*, *Humming* of *Bees*, *Soft Singing*, *Reading*, &c. The *Cause* is, for that they moue in the *Spirits* a gentle *Attention*; And whatsoeuer moueth *Attention*, without too much *Labour*, stilleth the *Naturall* and *discursive Motion* of the *Spirits*.

Sleepe nourisheth, or at least preserueth *Bodies*, a long time, without other *Nourishment*, *Beasts* that sleepe in *Winter* (as it is noted of *Wilde Beares*,) during their *Sleep* wax very *Fat*, though they *Eat* nothing. *Bats* haue beene found in *Ouens*, and other *Hollow Close Places*, Matted one vpon another; And therefore it is likely that they *Sleep* in the *Winter* time, and eat *Nothing*. *Quare*, whether *Bees* doe not *Sleep* all *Winter*, and spare their *Honey*? *Butterflies*, and other *Flies*, doe not onely *Sleepe*, but lye as *Dead* all *Winter*; And yet with a little *Heat* of *Sunne*, or *Fire*, reuiue againe. A *Dormouse*, both *Winter* and *Summer*, will *Sleepe* some daies together, and eat *Nothing*.

To restore *Teeth* in *Age*, were *Magnalia Naturæ*. It may be thought of. But howsoeuer the *Nature* of the *Teeth* deserueth to be enquired of, as well as the other *Parts* of *Living Creatures Bodies*.

There be *Fiue Parts* in the *Bodies* of *Living-Creatures*, that are of *Hard Substance*; The *Skull*; The *Teeth*; The *Bones*; The *Hornes*; and the *Nailles*. The greatest *Quantity* of *Hard Substance* Continued, is towards the *Head*. For there is the *Skull* of one *Entire Bone*; There are the *Teeth*; There are the *Maxillary Bones*; There is the *Hard Bone*, that is the *Instrument* of *Hearing*; And thence issue the *Hornes*: So that the *Building* of *Living Creatures Bodies*, is like the *Building* of a *Timber-House*, where the *Walls* and other *Parts* haue *Columnes* and *Beames*; But the *Roofe* is, in the better *Sort* of *Houses*, all *Tile*, or *Lead*, or *Stone*. As for *Birds*, they haue *Three* other *Hard Substances* proper to them; The *Bill*, which is of like *Matter* with the *Teeth*; For no *Birds* haue *Teeth*: The *Shell* of the *Egge*: And their *Quills*: For as for their *Spurre*, it is but a *Naille*. But no *Living-Creatures*, that haue *Shells* very hard; (As *Oysters*, *Cockles*, *Mussels*, *Scallops*, *Crabs*, *Lobsters*, *Cra-Fish*, *Shrimps*, and especially the *Tortoise*,) haue *Bones* within them, but onely little *Gristles*.

Bones, after full *Growth*, continue at a *Stay*: And so doth the *Skull*: *Hornes*, in some *Creatures*, are cast and renewed: *Teeth* stand at a *Stay* except their *Wearing*: As for *Nailles*, they grow continually: And *Bills* and *Beakes* will ouer-grow, and sometimes be cast; as in *Eagles*, and *Parrots*.

Most of the *Hard Substances* flye to the *Extremes* of the *Body*; As *Skull*, *Hornes*, *Teeth*, *Nailles*, and *Beakes*: Only the *Bones* are more *Inward*, and clad with *Flesh*. As for the *Entrailes*, they are all without *Bones*; Saue that a *Bone* is (sometimes) found in the *Heart* of a *Stag*; And it may be in some other *Creature*.

745

746

Experiments
in Confort
touching Teeth
and Hard Sub-
stances in the
Bodies of Living
Creatures.

747

748

749

750

The Skull hath Braines, as a kinde of Marrow, within it. The Back-Bone hath one Kinde of Marrow, which hath an Affinity with the Braine; And other Bones of the Body haue another. The Jaw-Bones haue no Marrow Seuered, but a little Pulpe of Marrow diffused. Teeth likewise are thought to haue a kinde of Marrow diffused, which causeth the Sense, and Paine: But it is rather Sinnew; For Marrow hath no Sense; No more than Blond. Horne is alike thorowout; And so is the Naile.

751

None other of the Hard Substances haue Sense, but the Teeth; And the Teeth haue Sense, not onely of Paine, but of Cold.

But we will leaue the Enquiries of other Hard Substances, unto their seuerall Places; And now enquire onely of the Teeth.

752

The Teeth are, in Men, of three Kindes: Sharpe, as the Fore-Teeth; Broad, as the Back-Teeth, which we call the Molar-Teeth, or Grinders; And Pointed Teeth, or Canine, which are betweene both. But there haue beene some Men, that haue had their Teeth undiuided, as of one whole Bone, with some little Marke in the Place of the Diuision; as Pyrrhus had. Some Creatures haue Over-long, or Out-growing Teeth, which wee call Fangs, or Tuskes; As Boares, Pikes, Salmons, and Dogs though lesse. Some Lining Creatures haue Teeth against Teeth; As Men, and Horses; And some haue Teeth, especially their Master-Teeth, indented one within Another, like Sawes; As Lions; And so againe haue Dogs. Some Fishes haue diuers Rows of Teeth in the Roofes of their Mouthes; As Pikes, Salmons, Trouts, &c. And many more in Salt-Waters. Snakes and other Serpents, haue Venomous Teeth; which are sometimes mistaken for their Sting.

753

No Beast that hath Hornes, hath Vpper Teeth; And no Beast, that hath Teeth aboue, wanteth them below: But yet if they be of the same kinde, it followeth not, that if the Hard Matter goeth not into Vpper Teeth, it will goe into Hornes; Nor yet e conuerso; For Doe's, that haue no Hornes, haue no Vpper Teeth.

754

Horses haue, at three yeeres old, a Tooth put forth, which they call the Colts Tooth; And at foure yeeres old there commeth the Mark-Tooth, which hath a Hole, as big as you may lay a Pease within it; And that weareth shorter and shorter, euery yeere; Till that at eight yeeres old, the Tooth is smooth, and the Hole gone; And then they say; That the Marke is out of the Horses Mouth.

755

The Teeth of Men breed first, when the Childe is about a yeere and halfe old: And then they cast them, and new come about seuen yeeres old. But diuers haue Back-ward Teeth come forth at Twenty, yea some at Thirty, and Forty. Quare of the manner of the Comming of them forth. They tell a Tale of the old Countesse of Desmond, who liued till she was seuen-score yeeres old, that she did Dentire, twice, or thrice; Casting her old Teeth, and others Comming in their Place.

756

Teeth are much hurt by Sweet-Meats; And by Painting with Mercury; And by Things Ouer-hot; And by Things Ouer-cold; And by Rheumes. And the Paine of the Teeth, is one of the sharpest of Paines.

Concerning

Concerning *Teeth*, these Things are to bee Considered, 1. The *Preserving* of them. 2. The *Keeping* of them *White*. 3. The *Drawing* of them with *Least Paine*. 4. The *Staying* and *Easing* of the *Tooth-Ach*. 5. The *Binding* in of *Artificiall Teeth*, where *Teeth* have beene stricken out. 6. And last of all, that Great One, of *Restoring Teeth* in *Age*. The *Instances* that giue any likelihood of *Restoring Teeth* in *Age*, are; The *Late Comming* of *Teeth* in some; And the *Renewing* of the *Beakes* in *Birds*, which are Commateriall with *Teeth*. *Quere* therefore more particularly how that commeth. And againe, the *Renewing* of *Hornes*. But yet that hath not beene knowne to haue beene prouoked by *Art*; Therefore let *Trial* be made, whether *Hornes* may be procured to grow in *Beasts* that are not *Horned*, and how? And whether they may be procured to come *Larger* than vsuall; As to make an *Oxe*, or a *Deere*, haue a *Greater Head* of *Hornes*? And whether the *Head* of a *Deere*, that by *Age* is more *Spitted*, may be brought againe to be more *Branched*; For these *Trialls*, and the like, will shew, whether by *Art* such *Hard Matter* can be called, and prouoked. It may be tried also, whether *Birds* may not haue some thing done to them, when they are *Young*, whereby they may be made to haue *Greater*, or *Longer Bils*; Or *Greater* and *Longer Talons*? And whether *Children* may not haue some *Wash*, or Something to make their *Teeth Better*, and *Stronger*? *Corall* is in vſe as an *Helpe* to the *Teeth* of *Children*.

SOME *Liuing Creatures* generate but at certaine *Seasons* of the *Yeere*; As *Deere*, *Sheepe*, *Wilde Conneyes*, &c. And most Sorts of *Birds*, and *Fishes*: Others at any time of the *Yeere*, as *Men*; And all *Domesticke Creatures*; As *Horses*, *Hogges*, *Dogges*, *Cats*, &c. The Cause of *Generation* at all *Seasons* seemeth to bee *Fulnesse*: For *Generation* is from *Redundance*. This *Fulnesse* ariseth from two *Causes*; Either from the *Nature* of the *Creature*, if it be *Hot*, and *Moist*, and *Sanguine*; Or from *Plenty* of *Food*. For the first, *Men*, *Horses*, *Dogs*, &c. which breed at all *Seasons*, are full of *Heat* and *Moisture*; *Doves* are the fullest of *Heat* and *Moisture* amongst *Birds*, and therefore breed often; The *Tame Dove* almost continually. But *Deere* are a *Melancholy Dry Creature*, as appeareth by their *Fearefulnessse*, and the *Hardnesse* of their *Flesh*. *Sheepe* are a *Cold Creature*, as appeareth by their *Mildnesse*, and for that they seldome *Drinke*. Most sort of *Birds* are of a dry *Substance* in comparison of *Beasts*. *Fishes* are cold. For the second Cause, *Fulnesse* of *Food*; *Men*, *Kine*, *Swine*, *Dogs*, &c. feed full; And we see that those *Creatures*, which being *Wilde*, generate seldome, being *Tame*, generate often; Which is from *Warmth*, and *Fulnesse* of *Food*. We finde, that the Time of *Going to Rut* of *Deere*, is in *September*; For that they need the whole *Summers Feed* and *Grasse*, to make them fit for *Generation*. And if *Raine* come Early about the Middle of *September*, they goe to *Rut* somewhat the sooner; If *Drought*, somewhat the later. So *Sheepe*, in respect of their small *Heat*, generate about the same time, or somewhat before. But for the most part, *Creatures* that generate at cer-

tainc *Seasons*, generate in the *Spring*; As *Birds*, and *Fishes*; For that the *End* of the *Winter*, and the *Heat*, and *Comfort* of the *Spring* preparcth them. There is also another *Reason*, why some *Creatures* generate at certaine *Seasons*: And that is the *Relation* of their *Time* of *Bearing*, to the time of *Generation*: For no *Creature* goeth to generate, whilest the *Female* is full; Nor whilest she is busie in *Sitting* or *Rearing* her *Young*. And therefore it is found by *Experience*, that if you take the *Egges*, or *Young Ones*, out of the *Nests* of *Birds*, they will fall to generate againe, three or foure times, one after another.

759

Of *Living Creatures*, some are *Longer time* in the *Wombe*, and some *Shorter*. *Women* goe commonly nine *Moneths*; The *Cow* and the *Ewe* about six *Moneths*; *Do's* goe about nine *Moneths*; *Mares* eleuen *Moneths*; *Bitches* nine *Weekes*; *Elephants* are said to goe two *Yeeres*; For the *Receiued Tradition* of ten *Yeeres* is *Fabulous*. For *Birds* there is double *Enquiry*; The *Distance* betweene the *Treading* or *Coupling*, and the *Laying* of the *Egge*; And againe betweene the *Egge Layed*, and the *Disclosing* or *Hatching*. And amongst *Birds*, there is lesse *Diuerfity* of *Time* than amongst other *Creatures*; yet some there is: for the *Hen* sitteth but three *Weekes*; The *Turkey-Hen*, *Goose*, and *Ducke*, a *Moneth*. *Quare* of others. The *Cause* of the great *Difference* of *Times*, amongst *Living Creatures*, is, Either from the *Nature* of the *Kinde*; Or from the *Constitution* of the *Wombe*. For the former, those that are longer in *Comming* to their *Maturity* or *Growth*, are longer in the *Wombe*; As is chiefly seene in *Men*; And so *Elephants* which are long in the *Wombe*, are long time in *Comming* to their full *Growth*. But in most other *Kindes*, the *Constitution* of the *Wombe*, (that is, the *Hardnesse* or *Driness* thereof,) is concurrent with the former *Cause*. For the *Colt* hath about foure *yeeres* of *Growth*; And so the *Fawne*; And so the *Calse*. But *Whelps*, which come to their *Growth* (commonly) within three *Quarters* of a *yeere*, are but nine *Weekes* in the *Wombe*. As for *Birds*, as there is lesse *Diuerfity* amongst them, in the time of their *Bringing forth*; So there is lesse *Diuerfity* in the time of their *Growth*; Most of them *comming* to their *Growth* within a *Twelue-Moneth*.

760

Some *Creatures* bring forth many *Young Ones* at a *Burthen*; As *Bitches*, *Hares*, *Conneyes*, &c. Some (ordinarily) but *One*; As *Women*, *Lionesses*, &c. This may be caused either by the *Quantity* of *Sperme* required to the *Producing* One of that *Kinde*; which if lesse bee required, may admit greater Number; If more, fewer: Or by the *Partitions* and *Cells* of the *Wombe*, which may feuer the *Sperme*.

Experiments
in Consort
touching *Species*
Visible.

761

There is no doubt, but *Light* by *Refraction* will shew greater, as well as *Things Coloured*. For like as a *Shilling*, in the *Bottom* of the *Water*, will shew greater; So will a *Candle* in a *Lanthe*, in the *Bottom* of the *Water*. I haue heard of a *Practise*, that *Glo-wormes* in *Glasses* were put in the *Water*, to make the *Fish* come. But I am not yet informed, whether when a *Diner* diueth, hauing his *Eyes* open, and swimmeth vpon his *Backe*;

Backe; whether (I say) he seeth *Things* in the *Aire* greater, or lesse. For it is manifest, that when the *Eye* standeth in the *Finer Medium*, and the *Object* is in the *Grosser*, things shew greater; But contrariwise, when the *Eye* is placed in the *Grosser Medium*, and the *Object* in the *Finer*, how it worketh I know not.

It would be well bouted out, whether great *Refractions* may not be made vpon *Reflexions*, as well as vpon *Direct Beames*. For Example, We see that take an *Empty Basen*, put an *Angell* of *Gold*, or what you will, into it; Then goe so farre from the *Basen*, till you cannot see the *Angell*, because it is not in a *Right Line*; Then fill the *Basen* with *Water*, and you shall see it out of his Place, because of the *Reflection*. To proceed therefore, put a *Looking-Glasse* into a *Basen* of *Water*; I suppose you shall not see the *Image* in a *Right Line*, or at equall *Angles*, but aside. I know not, whether this *Experiment* may not be extended so, as you might see the *Image*, and not the *Glasse*; Which for *Beauty* and *Strangenesse*, were a fine Prooffe: For then you should see the *Image* like a *Spirit* in the *Aire*. As for Example, If there be a *Cesterne* or *Poole* of *Water*, you shall place ouer against it a *Picture* of the *Deuill*, or what you will, so as you doe not see the *Water*. Then put a *Looking-Glasse* in the *Water*: Now if you can see the *Deuils Picture* aside, not seeing the *Water*, it will looke like a *Deuill* indeed. They haue an old Tale in *Oxford*, that *Friar Bacon* walked betweene two *Steeple*s: Which was thought to be done by *Glasses*, when he walked vpon the *Ground*.

A *Weighty Body* put into *Motion*, is more easily impelled, than at first when it *Resteth*. The *Cause* is, Partly because *Motion* doth discusse the *Torpeur* of *Solid Bodies*; Which beside their *Motion* of *Gravity*, haue in them a *Naturall Appetite*, not to moue at all; And partly, because a *Body* that resteth, doth get, by the *Resistance* of the *Body* vpon which it resteth, a stronger *Compression* of *Parts*, than it hath of it *Selfe*: And therefore needeth more *Force* to be put in *Motion*. For if a *Weighty Body* be *Penfile*, and hang but by a *Thred*, the *Percussion* will make an *Impulsion* very neere as easily, as if it were already in *Motion*.

A *Body* *Ouer-great*, or *Ouer-small*, will not be throwne so farre, as a *Body* of a *Middle Size*: So that (it seemeth) there must be a *Commensuration*, or *Proportion*, betweene the *Body Moued*, and the *Force*, to make it moue well. The *Cause* is, because to the *Impulsion*, there is requisite the *Force* of the *Body* that *Moueth*, and the *Resistance* of the *Body* that is *Moued*: And if the *Body* be *too great*, it yeeldeth *too little*; And if it be *too small*, it resisteth *too little*.

It is *Common Experience*, that no *Weight* will presse or cut so strong, being laid vpon a *Body*, as *Falling*, or *strucken* from *aboue*. It may be the *Aire* hath some part in furthering the *Percussion*: But the chiefe *Cause* I take to be, for that the *Parts* of the *Body Moued*, haue by *Impulsion*, or by the *Motion* of *Gravity continued*, a *Compression* in them, as well downwards, as they haue when they are throwne, or *Shot thorow the Aire*, forwards.

762

Experiments
in Consort,
touching Im-
pulsion and Per-
cussion.

763

764

765

Experiment
Solitary tou-
ching Titilla-
tion.

766

forwards. I conceiue also, that the quicke *Loose* of that *Motion*, preuenteth the *Resistance* of the *Body* below; And *Priority* of the *Force* (alwaies) is of great *Efficacy*; As appeareth in infinite *Instances*.

Tickling is most in the *Soles* of the *Feet*, and vnder the *Arme-Holes*, and on the *Sides*. The *Cause* is, the *Thinness* of the *Skinne* in those *Parts*; Ioynd with the *Rareness* of being touched there. For all *Tickling* is a light *Motion* of the *Spirits*, which the *Thinness* of the *Skin*, and *Suddenness*, and *Rareness* of *Touch*, doe further: For we see, a *Feather*, or a *Rush*, drawne along the *Lip*, or *Cheeke*, doth tickle; Whereas a *Thing* more *Obtuse*, or a *Touch* more *Hard*, doth not. And for *Suddenness*; We see no *Man* can tickle himselfe: We see also, that the *Palme* of the *Hand*, though it hath as *Thin* a *Skin*, as the other *Parts* Mentioned, yet is not *Ticklish*, because it is accustomed to be *Touched*. *Tickling* also causeth *Laughter*. The *Cause* may be, the *Emission* of the *Spirits*, and so of the *Breath*, by a *Flight* from *Titillation*; For vpon *Tickling*, we see there is euer a *Starting*, or *Shrinking* away of the *Part*, to auoid it; And we see also, that if you *Tickle* the *Nostrils*, with a *Feather*, or *Straw*, it procureth *Sneezing*; Which is a *Sudden Emission* of the *Spirits*, that doe likewise expell the *Moisture*. And *Tickling* is euer *Painfull*, and not well endured.

Experiment
Solitary tou-
ching the Scar-
city of Raine in
Egypt.

767

IT is strange, that the *Riner* of *Nilus*, Ouer-flowing as it doth, the *Country* of *Egypt*, there should be neuerthelesse little or no *Raine* in that *Country*. The *Cause* must be, Either in the *Nature* of the *Water*; Or in the *Nature* of the *Aire*; Or of Both. In the *Water*, it may be ascribed, either vnto the *Long Race* of the *Water*: For *Swift Running Waters* vapour not so much as *Standing Waters*; Or else to the *Concoction* of the *Water*; For *Waters* well *Concocted* vapour not so much, as *Waters Raw*; No more than *Waters* vpon the *Fire* doe vapour so much, after some time of *Boyling*, as at the first. And it is true, that the *Water* of *Nilus* is sweeter than other *Waters* in *Taste*; And it is excellent *Good* for the *Stone*, and *Hypochondriacall Melancholy*; Which sheweth it is *Lenessing*: And it runneth thorew a *Country* of a *Hot Climate*, and flat, without *Shade*, either of *Woods*, or *Hills*; Whereby the *Sunne* must needs haue great *Power* to *Concoct* it. As for the *Aire*, (from whence I conceiue this *Want* of *Showers* commeth chiefly;) The *Cause* must be, for that the *Aire* is, of it selfe, *Thin* and *Thirsty*; And as soone as euer it getteth any *Moisture* from the *Water*, it imbibeth, and dissipateth it, in the whole body of the *Aire*; And suffereth it not to remaine in *Vapour*; Whereby it might breed *Raine*.

Experiment
Solitary tou-
ching Clarifi-
cation.

768

IT hath beene touched in the *Title* of *Percolations*, (Namely such as are *Inwards*;) that the *Whites* of *Egs*, and *Milke*, doe *clarifie*; And it is certaine, that in *Egypt*, they prepare and *clarifie* the *Water* of *Nile*, by putting it into great *Iarres* of *Stone*, and *Stirring* it about with a few

Stamped

Stamped *Almonds*; Wherewith they also besmeare the Mouth of the *Vessel*; And so draw it off, after it hath rested some time. It were good, to trie this *Clarifying* with *Almonds*, in *New Beere*, or *Must*, to hasten, and perfect the *Clarifying*.

There be scarce to be found any *Vegetables*, that haue *Branches*, and no *Leaves*; except you allow *Corall* for one. But there is also in the *Desarts* of *S. Macario* in *Egypt*, a *Plant* which is Long, Leaueslesse, Browne of Colour, and Branched like *Corall*, saue that it closeth at the *Top*. This being set in *Water* within *House*, spreadeth and displayeth strangely; And the People thereabouts haue a Superstitious Beleefe, that in the *Labour* of *Women*, it helpeth to the *Easie Deliueraunce*.

The *Crystalline Venice Glasse*, is reported to be a Mixture, in equall Portions, of *Stones*, brought from *Pauia*, by the *River Ticinum*; And the *Ashes* of a *Weed* called by the *Arabs Kall*, which is gathered in a *Desart* betweene *Alexandria* and *Rosetta*; And is by the *Egyptians* vsed first for *Fuell*; And then they crush the *Ashes* into Lumps, like a *Stone*; And so sell them to the *Venetians* for their *Glasse-workes*.

It is strange, and well to be noted, how long *Carkasses* haue continued *Uncorrupt*, and in the former *Dimensions*; As appeareth in the *Mummies* of *Egypt*; Hauing lasted, as is conceiued, (some of them,) three thousand yeeres. It is true, they finde Meanes to draw forth the *Braines*, and to take forth the *Entrailes*, which are the *Parts* aptest to corrupt. But that is nothing to the Wonder: For we see, what a Soft and Corruptible Substance the *Flesh*, of all the other *Parts* of the *Body*, is. But it should seeme, that according to our *Observation*, and *Axiome*, in our hundredth *Experiment*, *Putrefaction*, which we conceiue to be so *Naturall* a *Period* of *Bodies*, is but an *Accident*; And that *Matter* maketh not that *Haste* to *Corruption*, that is conceiued. And therefore *Bodies*, in *Shining-Amber*; In *Quick-Siluer*; In *Balmes*, (whereof wee now speake;) In *Wax*; In *Honey*; In *Gummes*; And (it may be) in *Conservatories* of *Snow*; &c. are preserued very long. It need not goe for Repetition, if we resume againe that which we said in the aforesaid *Experiment*, concerning *Annihilation*; Namely, that if you provide against three *Causes* of *Putrefaction*, *Bodies* will not corrupt: The First is, that the *Aire* be excluded; For that vndermineth the *Body*, and conspireth with the *Spirit* of the *Body* to dissolue it. The Second is, that the *Body* *Adiacent* and *Ambient* be not *Commateriall*, but meerely *Heterogeneall* towards the *Body* that is to be preserued: For if Nothing can be receiued by the One, Nothing can issue from the Other; Such are *Quick-Siluer*, and *White-Amber*, to *Herbs*, and *Flies*, and such *Bodies*. The Third is, that the *Body* to be preserued, be not of that *Grosse*, that it may corrupt within it selfe, although no Part of it issue into the *Body* *Adiacent*: And therefore it must be rather *Thin*, and *Small*, than of *Bulke*. There is a Fourth *Remedie* also, which is; That

Experiment
Solitary, touching
Planis
without *Leaves*.

769

Experiment
Solitary, touching the
Materials of *Glasse*.

770

Experiment
Solitary, touching
Prohibition of *Putrefaction*, and the
Long Conservation
of *Bodies*.

771

That if the *Body* to be preserved be of *Bulke*, as a *Corps* is, then the *Body* that Incloseth it, must haue a Vertue to draw forth, and drie the *Moisture* of the *Inward Body*; For else the *Putrefaction* will play within, though nothing issue forth. I remember *Liuy* doth relate, that there were found, at a time, two *Coffins* of *Lead*, in a *Tombe*; Whereof the one contained the *Body* of *King Numa*; It being some foure hundred yeares after his Death: And the other, his *Bookes* of *Sacred Rites* and *Ceremonies*, and the *Discipline* of the *Pontifes*; And that in the *Coffin* that had the *Bodie*, there was Nothing (at all) to be seene, but a little light *Cinders* about the *Sides*; But in the *Coffin* that had the *Bookes*, they were found as fresh, as if they had beene but newly *Written*, being written in *Parchment*, and couered ouer with *Watch-Candles* of *Wax*, three or foure fold. By this it seemeth, that the *Romans*, in *Numa's* time, were not so good *Embalmers*, as the *Egyptians* were; Which was the *Cause* that the *Body* was vtterly consumed. But I finde in *Plutarch*, and Others, that when *Augustus Caesar* visited the *Sepulchre* of *Alexander the Great*, in *Alexandria*, he found the *Body* to keepe his *Dimension*; But withall, that, notwithstanding all the *Embalming*, (which no doubt was of the best,) the *Body* was so Tender, as *Caesar* touching but the *Nose* of it, defaced it. Which maketh mee finde it very strange, that the *Egyptian Mummies* should be reported to be as Hard as *Stone-Pitch*; For I finde no difference but one; Which indeed may be very *Materiall*; Namely, that the *Ancient Egyptian Mummies*, were shrowded in a Number of Folds of *Linnen*, besmeared with *Gummes*, in manner of *Seare-Cloth*; Which it doth not appeare was practised vpon the *Body* of *Alexander*.

Experiment
Solitary touching the
Abundance of Nitre in certaine
Sea-Shoares.

772

Experiment
Solitary touching Bodies
that are borne
vp by Water.

773

Experiment
Solitary touching Fuell,
that consumeth
little, or nothing.

774

Near the *Castle* of *Casie*, and by the *Wells* of *Affan*, in the *Land* of *Idumea*, a great Part of the *Way*, you would thinke the *Sea* were neare hand, though it be a good distance off: And it is Nothing, but the *Shining* of the *Nitre*, vpon the *Sea-Sands*; Such *Abundance* of *Nitre* the *Shores* there doe put forth.

The *Dead-Sea*, which vomiteth vp *Bitumen*, is of that *Crafsitude*, as *Living Bodies* bound Hand and Foot, cast into it, haue beene borne vp, and not sunke. Which sheweth, that all *Sinking* into *Water*, is but an *Ouer-Weight* of the *Body*, put into the *Water*, in respect of the *Water*: So that you may make *Water* so strong, and heauy, of *Quick-Siluer*, (perhaps,) or the like, as may beare vp *Iron*: Of which I see no Use, but *Imposture*. We see also, that all *Metalls*, except *Gold*, for the same reason, swimme vpon *Quick-Siluer*.

It is reported, that at the *Foot* of a *Hill*, neare the *Mare mortuum*, there is a *Blacke Stone*, (whereof *Pilgrims* make *Fires*,) which burneth like a *Coale*, and diminisheth not; But onely waxeth Brighter, and Whiter. That it should doe so, is not strange; For we see *Iron Red Hot* burneth, and consumeth not: But the Strangenesse is, that it should continue any time

time so: For *Iron*, as soone as it is out of the Fire, deadeth straightwaies. Certainly, it were a Thing of great Use, and Profit, if you could finde out *Fuell*, that would burne Hot, and yet last long: Neither am I altogether Incredulous, but there may be such *Candles*, as they say are made of *Salamanders Wooll*: Being a Kinde of *Minerall*, which whiteneth also in the Burning, and consumeth not. The Question is this; *Flame* must be made of somewhat; And commonly it is made of some *Tangible Body*, which hath *Weight*: But it is not impossible, perhaps, that it should be made of *Spirit* or *Vapour*, in a *Body*; (which *Spirit* or *Vapour* hath no *Weight*;) such as is the Matter of *Ignis Fatuus*. But then you will say, that that *Vapour* also can last but a short time: To that it may be answered, That by the helpe of *Oile* and *Wax*, and other *Candle-Stuffe*, the *Flame* may continue, and the *Wicke* not burne.

Sea-Coale last longer than Char-Coale; And Char-Coale of Roots, being scoaled into great Peeces, last longer than Ordinary Char-Coale. Turfe, and Peat, and Cow-Sheards, are cheape Fuels, and last long. Small-Coale, or Briar-Coale, powred vpon Char-Coale, make them last longer. Sedge is a cheape Fuell to Brew, or Bake with; the rather because it is good for Nothing else. Triall would be made of some Mixture of Sea-Coale with Earth, or Chalke; For if that Mixture be, as the Sea-Coale-Men vse it, priuily, to make the Bulke of the Coale greater, it is Deceit; But if it be vsed purposely, and be made knowne, it is Sauing.

IT is, at this Day, in vse, in *Gaza*, to couch *Pot-Sheards* or *Vessels* of *Earth*, in their *Walls*, to gather the *Wind* from the *Top*, and to passe it downe in *Spouts* into *Roomes*. It is a Deuice for *Freshnesse*, in great *Heats*: And it is said, there are some *Roomes* in *Italy*, and *Spaine*, for *Freshnesse*, and *Gathering* the *Winds*, and *Aire*, in the *Heats* of *Summer*. But they be but *Pennings* of the *Winds*, and *Enlarging* them againe, and *Making* them *Reuerberate*, and goe round in *Circles*, rather than this *Deuice* of *Spouts* in the *Wall*.

THere would be vsed much diligence, in the Choice of some *Bodies*, and *Places*, (as it were) for the *Tasting* of *Aire*; to discouer the *Wholesomenesse* or *Vnwholesomenesse*, as well of *Seasons*, as of the *Seats* of *Dwellings*. It is certaine, that there be some *Houses*, wherein *Confitures*, and *Pies*, will gather *Mould*, more than in Others. And I am perswaded, that a *Peece* of *Raw Flesh*, or *Fish*, will sooner corrupt in some *Aires*, than in Others. They be noble *Experiments*, that can make this *Discovery*; For they serue for a *Naturall Diuination* of *Seasons*; Better than the *Astronomers* can by their *Figures*: And againe, they teach *Men* where to chuse their *Dwelling*, for their better *Health*.

THere is a Kinde of *Stone*, about *Bethleem*, which they grinde to *Powder*, and put into *Water*, whereof *Cattell* drinke, which maketh them
giue

Experiment
Solitary Occo-
nomicall tou-
ching Cheape
Fuell.

775

Experiment
Solitary, tou-
ching the Ga-
thering of Wind
for Freshnesse.

776

Experiment
Solitary tou-
ching the Tri-
alls of Aire.

777

Experiment
Solitary tou-
ching Increa-

Expt of Milke in
Milch-Beasts.

778

giue more *Milke*. Surely, there would be some better *Trialls* made of *Mixtures* of *Water* in *Ponds* for *Castell*, to make them more *Milch*; Or to *Fatten* them; Or to *Keepe* them from *Murraine*. It may be, *Chalke*, and *Nitre*, are of the best.

Experiment
Solitary tou-
ching Sand of
the Nature of
Glasfe.

779

IT is reported, that in the *Valley*, neere the *Mountaine Carmel*, in *Iudea*, there is a *Sand*, which of all other, hath most *Affinity* with *Glasfe*; In-
somuch as other *Minerals*, laid in it, turne to a *Glasie Substance*, with-
out the *Fire*; And againe *Glasfe* put into it, turneth into the *Mother-Sand*.
The thing is very strange, if it be true: And it is likeliest to be Caused by
some *Naturall Fornace*, or *Heat* in the *Earth*: And yet they doe not speak
of any *Eruption* of *Flames*. It were good to try in *Glasfe-Workes*, whe-
ther the *Crude Materials* of *Glasfe*, mingled with *Glasfe*, already made, and
Re-moulten, doe not facilitate the *Making* of *Glasfe* with lesse *Heat*.

Experiment
Solitary tou-
ching the
Growth of Co-
rall.

780

IN the *Sea*, vpon the *South-West* of *Sicily*, much *Corall* is found. It is a
Sub-Marine Plant. It hath no *Leaues*: It brancheth only when it is vn-
der *Water*; It is *Soft*, and *Greene* of *Colour*; But being brought into the
Aire, it becommeth *Hard*, and *Shining Red*, as we see. It is said also,
to haue a *White Berry*; But we finde it not brought ouer with the *Corall*.
Belike it is cast away as nothing worth: Inquire better of it, for the *Dis-
covery* of the *Nature* of the *Plant*.

Experiment
Solitary, tou-
ching the Ga-
thering of
Manna.

781

THE *Manna* of *Calabria* is the best, and in most *Plenty*. They gather
it from the *Leafe* of the *Mulberry Tree*; But not of such *Mulberrie
Trees*, as grow in the *Valley's*. And *Manna* falleth vpon the *Leaues* by
Night, as other *Dewes* do. It should seeme, that before those *Dews* come
vpon *Trees* in the *Valley's*, they dissipate, and cannot hold out. It should
seeme also, the *Mulberry-Leafe*, it selfe, hath some *Coagulating Vertue*,
which inspissateth the *Dew*, for that it is not found vpon other *Trees*:
And we see by the *Silke-Worme*, which feedeth vpon that *Leafe*, what a
Dainty Smooth Iuyce it hath; And the *Leaues* also, (especially of the
Blacke Mulberry,) are somewhat *Bristly*, which may helpe to preserue
the *Dew*: Certainly, it were not amisse, to obserue a little better, the *Dews*
that fall vpon *Trees*, or *Herbs*, Growing on *Mountaines*; For, it may be,
many *Dewes* fall, that spend before they come to the *Valleyes*. And I sup-
pose, that he that would gather the best *May-Dew* for *Medicine*, should
gather it from the *Hills*.

Experiment
Solitary tou-
ching the Cor-
recting of Wine.

782

IT is said, they haue a manner, to prepare their *Greeke-Wines*, to keepe
them from *Fuming*, and *Inebriating*, by adding some *Sulphur*, or *Allome*:
Whereof the one is *Vnctuous*, and the other is *Astringent*. And certaine
it is, that those two *Natures* doe best repress *Fumes*. This *Experiment*
would be transferred, vnto other *Wine*, and *Strong Beere*, by Putting in
some like *Substances*, while they worke; Which may make them both
to *Fume* lesse, and to *Inflame* lesse.

It

IT is conceiued by some, (not improbably,) that the reason, why *Wilde-Fires*, (whereof the principall Ingredient is *Bitumen*;) doe not quench with *Water*, is, for that the first Concretion of *Bitumen* is a Mixture of a *Fiery*, and *Watry Substance*: So is not *Sulphur*. This appeareth, for that in the *Place* neare *Puteoli*, which they call the *Court of Vulcan*, you shall heare, vnder the *Earth*, a Horrible Thundring of *Fire*, and *Water*, conflicting together: And there breake forth also *Spouts* of *Boyling Water*. Now that *Place* yeeldeth great *Quantities* of *Bitumen*; Whereas *Aetna*, and *Vesuius*, and the like, which consist vpon *Sulphur*, shoot forth *Smoake*, and *Ashes*, and *Pumice*, but no *Water*. It is reported also, that *Bitumen* Mingled with *Lime*, and Put vnder *Water*, will make, as it were, an *Artificiall Rocke*; The *Substance* becommeth so Hard.

Experiment
Solitary tou-
ching the Ma-
terials of *Wilde-
Fire*.

783

THere is a *Cement*, compounded of *Floure*, *Whites of Egges*, and *Stone powdered*, that becommeth Hard as *Marble*; wherewith *Piscina mirabilis*, neare *Cuma*, is said to haue the *Walls* Plastered. And it is certaine, and tried, that the *Powder* of *Lead-Stone*, and *Flint*, by the Addition of *Whites of Egges*, and *Gum-Dragon*, made into *Paste*, will in a few dayes harden to the Hardnesse of a *Stone*.

Experiment
Solitary tou-
ching *Plaster*
growing as
Hard as *Marble*.

784

IT hath beene noted by the *Ancients*, that in *Full* or *Impure Bodies*, *Vlcers* or *Hurts* in the *Legs*, are Hard to Cure; And in the *Head* more Easie. The *Cause* is, for that *Vlcers* or *Hurts* in the *Legs* require *Desiccation*, which by the *Defluxion* of *Humours* to the *Lower Parts* is hindred; Whereas *Hurts* and *Vlcers* in the *Head* require it not; But contrariwise *Drinesse* maketh them more apt to Consolidate. And in *Moderne* Obseruation, the like difference hath been found, betweene *French-Men*, and *English-Men*; Whereof the ones *Constitution* is more *Drie*, and the others more *Moiſt*. And therefore a *Hurt* of the *Head* is harder to cure in a *French-Man*, and of the *Legge* in an *English-Man*.

Experiment
Solitary tou-
ching Iudge-
ment of the
Cure in some
Vlcers and
Hurts.

785

IT hath beene noted by the *Ancients*, that *Southerne Winds*, blowing much, without *Raine*, doe cause a *Feuourous Disposition* of the *Yeare*; But with *Raine*, not. The *Cause* is, for that *Southerne Winds* doe, of themselves, qualifie the *Aire*, to be apt to cause *Feuers*; But when *Showers* are ioyned, they doe Refrigerate in Part, and Checke the Sultry Heat of the *Southerne Wind*. Therefore this holdeth not in the *Sea-Coasts*, because the *Vapour* of the *Sea*, without *Showers*, doth refresh.

Experiment
Solitary tou-
ching the
Healthfulnesse
or Vnhealthful-
nesse of the *Sou-
therne Wind*.

786

IT hath beene noted by the *Ancients*, that *Wounds* which are made with *Brasse*, heale more easily, than *Wounds* made with *Iron*. The *Cause* is, for that *Brasse* hath, in it selfe, a *Sanative Vertue*; And so in the very Instant helpeth somewhat: But *Iron* is *Corrosiue*, and not *Sanative*. And therefore it were good, that the *Instruments* which are vsed by *Chirurgians* about wounds, were rather of *Brasse*, than *Iron*.

Experiment
Solitary tou-
ching *Wounds*.

787

In

Experiment
Solitary, touch-
ing Mortifi-
cation by Cold.

788

IN the *Cold Countries*, when *Mens Noses* and *Eares* are Mortified, and (as it were) Gangrened with *Cold*, if they come to a *Fire*, they rot off presently. The *Cause* is, for that the few *Spirits*, that remaine in those *Parts*, are suddenly drawne forth, and so *Putrefaction* is made Compleat. But *Snow* Put vpon them, helpeth; For that it preserueth those *Spirits* that remaine, till they can reuiue; And besides, *Snow* hath in it a Secret *Warmth*: As the *Monke* proued out of the *Text*; *Qui dat Ninem sicut Lannam, Gelu sicut Cineres spargit*. Whereby he did inferre, that *Snow* did warme like *Wool*, and *Frost* did fret like *Asbes*. *Warmed Water* also doth good; Because by little and little it openeth the *Pores*, without any sudden Working vpon the *Spirits*. This *Experiment* may be transferred vnto the *Cure* of *Gangrenes*, either Comming of themselves, or induced by too much Applying of *Opiates*: Wherein you must beware of *Drie Heat*, and resort to Things that are *Refrigerants*, with an Inward *Warmth*, and *Vertue* of Cherishing.

Experiment
Solitary touch-
ing weight.

789

WEigh *Iron*, and *Aqua Fortis*, seuerally; Then dissolue the *Iron* in the *Aqua Fortis*: And weigh the *Dissolution*; And you shall finde it to beare as good *Weight*, as the *Bodies* did seuerally: Notwithstanding a good deale of *Waste*, by a thicke *Vapour*, that issueth during the *Working*: Which sheweth, that the *Opening* of a *Body*, doth increase the *Weight*. This was tried once, or twice, but I know not, whether there were any *Error*, in the *Triall*.

Experiment
Solitary touch-
ing the Su-
per-Natation of
Bodies.

790

TAKE of *Aqua-Fortis* two *Ounces*, of *Quick-silver* two *Drachmes*; (For that Charge the *Aqua-Fortis* will beare;) The *Dissolution* will not beare a *Flint*, as big as a *Nutmeg*: Yet (no doubt) the Increasing of the *Weight* of *Water*, will increase his *Power* of *Bearing*; As wee see *Broine*, when it is Salt enough, will beare an *EGGE*. And I remember well a *Physitian*, that vsed to giue some *Minerall Baths* for the *Gout*, &c. And the *Body* when it was put into the Bath, could not get downe so easily, as in *Ordinary Water*. But it seemeth, the *Weight* of the *Quick-silver*, more than the *Weight* of a *Stone*, doth not compensate the *Weights* of a *Stone*, more than the *Weights* of the *Aqua-Fortis*.

Experiment
Solitary touch-
ing the Fly-
ing of Vnquall
Bodies in the
Aire.

791

LET there be a *Body* of *Vnequall Weight*; (As of *Wood* and *Lead*, or *Bone* and *Lead*;) If you throw it from you with the *Light-End* forward, it will turne, and the *Weightier End* will recouer to be *Forwards*; Vnlesse the *Body* be *Ouer-long*. The *Cause* is, for that the more *Dense Body*, hath a more *Violent Pressure* of the *Parts*, from the first *Impulsion*; Which is the *Cause*, (though heretofore not found out, as hath beene often said,) of all *Violent Motions*: And when the *Hinder Part* moueth swifter, (for that it lesse endureth *Pressure* of *Parts*;) than the *Forward Part* can make way for it, it must needs be, that the *Body* turne ouer: For (turned) it can more easily draw forward the *Lighter Part*. *Galileus* noteth it well; That if an *Open Trough*, wherein *Water* is, be driuen faster than the *Water*

can

can follow, the *Water* gathereth vpon an heap, towards the *Hinder End*, where the *Motion* began; Which he supposeth, (holding confidently the *Motion* of the *Earth*,) to be the *Cause* of the *Ebbing* and *Flowing* of the *Ocean*; Because the *Earth* ouer-runneeth the *Water*. Which *Theory*, though it be false, yet the first *Experiment* is true. As for the *Inequality* of the *Pressure* of *Parts*, it appeareth manifestly in this; That if you take a *Body* of *Stone*, or *Iron*, and another of *Wood*, of the same *Magnitude*, and *Shape*, and throw them with equall *Force*, you cannot possibly throw the *Wood*, so farre, as the *Stone*, or *Iron*.

IT is certaine, (as it hath beene formerly, in part, touched,) that *Water* may be the *Medium* of *Sounds*. If you dash a *Stone* against a *Stone* in the *Bottome* of the *Water*, it maketh a *Sound*. So a long *Pole* struck vpon *Gravel*, in the *Bottome* of the *Water*, maketh a *Sound*. Nay, if you should thinke that the *Sound* commeth vpon by the *Pole*, and not by the *Water*, you shall finde that an *Anchor*, let downe by a *Roape*, maketh a *Sound*; And yet the *Roape* is no *Solid Body*, whereby the *Sound* can ascend.

ALL *Objects* of the *Senses*, which are very *Offensive*, do cause the *Spirits* to retire; And vpon their *Flight*, the *Parts* are (in some degree) destitute; And so there is induced in them a *Trepidation* and *Horror*. For *Sounds*, we see that the *Grating* of a *Saw*, or any very *Harsh Noise*, will set the *Teeth* on edge, and make all the *Body* shiuer. For *Tastes*, we see that in the *Taking* of a *Potion*, or *Pils*, the *Head*, and the *Necke* shake. For *Odious Smells*, the like Effect followeth, which is lesse perceined, because there is a *Remedy* at hand, by *Stopping* of the *Nose*: But in *Horses*, that can vse no such *Help*, we see the *Smell* of a *Carrion*, especially of a *Dead Horse*, maketh them fly away, and take on, almost as if they were *Mad*. For *Feeling*, if you come out of the *Sunne*, suddenly, into a *Shade*, there followeth a *Chilnesse* or *Shiuering* in all the *Body*. And euen in *Sight*, which hath (in effect) no *Odious Object*, Comming into *Sudden Darknesse*, induceth an *Offer* to *Shiuer*.

There is, in the *City* of *Ticinum*, in *Italy*, a *Church*, that hath *Windows* onely from aboue: It is in *Length* an *Hundred Feet*, in *Breadth* *Twenty Feet*, and in *Height* neere *Fifty*; Hauing a *Doore* in the *Middest*. It reporteth the *Voice*, twelue or thirteene times, if you stand by the *Close End-Wall*, ouer against the *Doore*. The *Eccho* fadeth and dyeth by little and little, as the *Eccho* at *Pont-charenton* doth. And the *Voice* foundeth, as if it came from aboue the *Doore*. And if you stand at the *Lower End*, or on either *Side* of the *Doore*, the *Eccho* holdeth; But if you stand in the *Doore*, or in the *Middest* iust ouer against the *Doore*, not. Note that all *Eccho's* sound better against *Old walls*, than *New*; Because they are more *Dry*, and *Hollow*.

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Experiment
Solitary touching
Water, that it may bee
the Medium of
Sounds.

792

Experiment
Solitary of the
Flight of the
Spirits vpon
Odious Objects.

793

Experiment
Solitary touching the
Super-Reflexion of
Eccho's.

794

Experiment
Solitary tou-
ching the Force
of Imagination,
Imitating that
of the Sense.

795

THose Effects, which are wrought by the Percussion of the Sense, and by Things in Faet, are produced likewise, in some degree, by the Imagination. Therefore if a Man see another eat *Sowre* or *Acide Things*, which set the Teeth on edge, this Object tainteth the Imagination. So that he that seeth the Thing done by another, hath his owne Teeth also set on edge. So if a Man see another turne swiftly, and long; Or if he looke vpon *Wheeles* that turne, Himselfe waxeth *Turne-sicke*. So if a Man bee vpon an *High Place*, without *Railes*, or good Hold, except he be vsed to it, he is Ready to Fall: For Imagining a Fall, it putteth his Spirits into the very Action of a Fall. So Many vpon the Seeing of others *Bleed*, or *Strangled*, or *Tortured*, Themselues are ready to faint, as if they Bled, or were in *Strife*.

Experiment
Solitary tou-
ching Prefer-
uation of Bodies.

796

TAKE a *Stock-Gilly-Flower*, and tie it gently vpon a Sticke, and put them both into a *Stoope-Glasse*, full of *Quick-siluer*, so that the Flower be covered: Then lay a little *Weight* vpon the Top of the *Glasse*, that may keepe the Sticke downe; And look vpon them after foure or fiue daies; And you shall finde the Flower Fresh, and the Stalke Harder, and lesse Flexible, than it was. If you compare it with another Flower, gathered at the same time, it will be the more manifest. This sheweth, that Bodies doe preferue excellently in *Quick-siluer*; And not preferue only, but, by the Coldnesse of the *Quick-siluer*, Indurate; For the Freshnesse of the Flower may be meerely Conservation; (which is the more to be obserued, because the *Quick-siluer* presseth the Flower;) But the Stiffenesse of the Stalke cannot be without Induration, from the Cold (as it seemeth,) of the *Quick-siluer*.

Experiment
Solitary, tou-
ching the
Growth, or
Multipling of
Metals.

797

IT is reported by some of the Ancients, that in *Cyprus*, there is a Kinde of *Iron*, that being cut into *Little Peeces*, and put into the Ground, if it be well Watred, will increase into *Greater Peeces*. This is certaine, and knowne of Old; That *Lead* will multiply, and Increase; As hath beene seene in *Old Statua's* of *Stone*, which haue beene put in *Cellars*; The Feet of them being bound with *Leaden Bands*; Where (after a time) there appeared, that the *Lead* did swell; Insomuch as it hanged vpon the *Stone* like *Warts*.

Experiment
Solitary, tou-
ching the
Drowning of
the more Base
Metall in the
more Precious.

798

CALL *Drowning of Metals*, when that the *Baser Metall*, is so incorporate with the more *Rich*, as it can by no Meanes be separated againe: which is a kinde of *Version*, though False: As if *Siluer* should be inseparably incorporated with *Gold*; Or *Copper*, and *Lead*, with *Siluer*. The Ancient *Electrum* had in it a Fifth of *Siluer* to the *Gold*; And made a *Compound Metall*, as fit for most vses, as *Gold*; And more Resplendent, and more Qualified in some other Properties; But then that was easily Separated. This to doe priuily, or to make the *Compound* passe for the *Rich Metall* Simple, is an *Adulteration*, or *Counterfeiting*: But if it bee done Auowedly, and without Disguizing, it may be a great *Sauing* of the

the *Richer Metall*. I remember to haue heard of a Man skillfull in *Metals*, that a Fifteenth Part of *Siluer*, incorporate with *Gold*, will not be Recovered by any *Water of Separation*; Except you put a Greater *Quantity* of *Siluer*, to draw to it the *Lesse*; which (he said) is the last Refuge in *Separations*. But that is a tedious way, which no Man (almost) will thinke on. This would be better enquired; And the *Quantity* of the Fifteenth turned to a Twentieth; And likewise with some little *Additionall*, that may further the *Intrinsique Incorporation*. Note that *Siluer* in *Gold* will be detected by *Weight*, compared with the *Dimension*; But *Lead* in *Siluer*, (*Lead* being the *Weightier Metall*;) will not bee detected; If you take so much the more *Siluer*, as will counteruaile the *Over-Weight* of the *Lead*.

Gold is the only *Substance*, which hath nothing in it *Volatile*, and yet melteth without much difficulty. The *Melting* sheweth that it is not *Ieiune*, or *Scarce* in *Spirit*. So that the *Fixing* of it, is not *Want* of *Spirit* to fly out, but the *Equall Spreading* of the *Tangible Parts*, and the *Close Coacervation* of them: Whereby they haue the lesse *Appetite*, and no meanes (at all) to issue forth. It were good therefore to try, whether *Glasse Re-Moulten* doe leese any *Weight*? For the *Parts* in *Glasse* are euently Spred; But they are not so Close as in *Gold*; As wee see by the Easie Admission of *Light*, *Heat*, and *Cold*; And by the *Smalnesse* of the *Weight*. There be other *Bodies*, *Fixed*, which haue little or no *Spirit*: So as there is nothing to fly out; As we see in the *Stuffe*, whereof *Copples* are made; Vvhich they put into *Furnaces*; Vpon which *Fire* worketh not: So that there are three *Causes* of *Fixation*; The Euen *Spreading* both of the *Spirits*, and *Tangible Parts*; The *Closenesse* of the *Tangible Parts*; And the *Ieiunenesse* or *Extreme Comminution* of *Spirits*: Of which Three, the Two First may be ioyned with a *Nature Liquefiable*; The Last not.

IT is a *Profound Contemplation* in *Nature*, to consider of the *Emptinesse* (as we may call it) or *Insatisfaction* of seuerall *Bodies*; And of their *Appetite* to take in Others. *Aire* taketh in *Lights*, and *Sounds*, and *Smells*, and *Vapours*; And it is most manifest, that it doth it, with a kinde of *Thirst*, as not satisfied with his owne former *Consistence*; For else it would neuer receiue them in so suddenly, and easily. *Water* and all *Liquors*, doe hastily receiue *Dry* and more *Terrestriall Bodies*, Proportionable: And *Dry Bodies*, on the other side, drinke in *Waters*, and *Liquors*: So that, (as it was well said, by one of the *Ancients*, of *Earthy* and *Watry Substances*;) *One is a Glue to another*. *Parchment*, *Skins*, *Cloth*, &c. drinke in *Liquors*, though themselues be *Entire Bodies*, and not *Comminuted*, as *Sand*, and *Asbes*; Nor apparantly *Porous*: *Metals* themselues doe receiue in readily *Strong-Waters*; And *Strong-Waters* likewise doe readily pierce into *Metals*, and *Stones*: And that *Strong-Water* will touch vpon *Gold*, that will not touch vpon *Siluer*; And *e conuerso*. And *Gold*,

Experiment
Solitary touching
Fixation
of Bodies.

799

Experiment
Solitary touching the
Restlesse Nature of
Things in
Themselves, and
their Desire to
Change.

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which

which seemeth by the *Weight* to be the Closest, and most Solid *Body*, doth greedily drinke in *Quick-Silver*. And it seemeth, that this *Reception* of other *Bodies*, is not Violent: For it is (manytimes) Reciprocall, and as it were with Consent. Of the *Cause* of this, and to what *Axiome* it may be referred, consider attentively; For as for the Pretty Affection, that *Matter* is like a *Common Strumpet*, that desireth all *Formes*, it is but a *Wandering Notion*. Onely *Flame* doth not content it selfe to take in any other *Body*; But either, to overcome and turne another *Body* into it Selfe, as by Victory; Or it Selfe to dye, and goe out. •

NATV.



NATVRALL HISTORIE.

IX. Century.



It is certaine, that all *Bodies* whatsoeuer, though they haue no *Sense*, yet they haue *Perception*: For when one *Body* is applied to another, there is a Kinde of *Election*, to embrace that which is Agreeable, and to exclude or expell that which is Ingrate: And whether the *Body* be *Alterant*, or *Altered*, euermore a *Perception* precedeth *Operation*: For else all *Bodies* would be alike One to Another. And sometimes this *Perception* in some Kinde of *Bodies*, is farre more Subtill than the *Sense*; So that the *Sense* is but a dull Thing in Comparison of it: Wee see a *Weather-Glasse*, will finde the least difference of the *Weather*, in *Heat*, or *Cold*, when Men finde it not. And this *Perception* also, is sometimes at *Distance*, as well as vpon the *Touch*; As when the *Load-Stone* draweth *Iron*, or

Experiments
in Consort,
touching Per-
ception in *Bodies*
Insenfible, ten-
ding to *Natural*
Diuination, or
Subtill Trials.

Flame fireth *Naphtha* of *Babylon*, a great distance off. It is therefore a *Subiect* of a very *Noble Enquiry*, to enquire of the more *Subtill Perceptions*; For it is another *Key* to open *Nature*, as well as the *Sense*; And sometimes Better. And besides, it is a *Principall Meanes* of *Naturall Diuination*; For that which in these *Perceptions* appeareth early, in the great *Effects* commeth long after. It is true also, that it serueth to *discover* that which is *Hid*, as well as to *foretell* that which is to *Come*; As it is in many *Subtill Trialls*; As to try whether *Seeds* be old, or new, the *Sense* cannot informe: But if you boile them in *Water*, the *New Seeds* will sprout sooner: And so of *Water*, the *Taste* will not discover the best *Water*; But the *Speedy Consuming* of it, and many other *Meanes*, which we haue heretofore set downe, will discover it. So in all *Physiognomy*, the *Lineaments* of the *Body* will discover those *Naturall Inclinations* of the *Minde*, which *Disimulation* will con-
ceale, or *Discipline* will suppress. We shall therefore now handle only, those two *Perceptions*, which pertaine to *Naturall Diuination*, and *Discovery*: Leauing the Handling of *Perception* in other Things, to be disposed Elsewhere. Now it is true, that *Diuination* is attained by other *Meanes*; As if you know the *Causes*; If you know the *Concomitants*; you may iudge of the *Effect* to follow: And the like may bee said of *Discovery*; But we tie our Selues here, to that *Diuination* and *Discovery* chiefly, which is Caused by an *Early*, or *Subtill Perception*.

The *Apnesse* or *Propension* of *Aire*, or *Water*, to Corrupt or Putrifie, (no doubt,) is to be found before it breake forth into manifest *Effects* of *Diseases*, *Blastings*, or the like. Wee will therefore set downe some *Prognosticks* of *Pestilentiall* and *Vnwholsome Yeeres*.

801

The *Wind* blowing much from the *South*, without *Raine*; And *Wormes* in the *Oake-Apple*; haue beene spoken of before. Also the *Plenty* of *Frogs*, *Grashoppers*, *Flies*, and the like *Creatures* bred of *Putrefaction*, doth portend *Pestilentiall Yeeres*.

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Great, and *Early Heats* in the *Spring*, (and namely in *May*.) without *Winds*, portend the same; And generally so doe *Yeeres* with little *Wind*, or *Thunder*.

Great

Great Droughts in Summer, lasting till towards the End of August, and some Gentle Showers vpon them; And then some Drie Weather againe; Doe portend a Pestilent Summer, the Yeare following: For about the End of August, all the Sweetnesse of the Earth, which goeth into Plants, and Trees, is exhaled; (And much more if the August be drie;) So that nothing then can breathe forth of the Earth, but a grosse Vapour, which is apt to Corrupt the Aire: And that Vapour, by the first Showers, if they be Gentle, is released, and commeth forth abundantly. Therefore they that come abroad soone after those Showers, are commonly taken with Sicknesse: And in Affricke, no Bodie will stirre out of doores, after the first Showers. But if the Showers come vehemently, then they rather wash and fill the Earth, than giue it leaue to breathe forth presently. But if Dry Weather come againe, then it fixeth and continueth the Corruption of the Aire, vpon the first Showers begun; And maketh it of ill Influence, euen to the Next Summer; Except a very Frosty Winter discharge it; Which seldome succeedeth such Drought.

The Lesser Infections, of the Small Pockes, Purple Feners, Agues, in the Summer Precedent, and howering all Winter, doe portend a great Pestilence in the Summer following; For Putrefaction doth not rise to his height at once.

It were good to lay a Peece of Raw Flesh, or Fish, in the Open Aire; And if it Putrefie quickly, it is a Signe of a Disposition in the Aire to Putrefaction. And because you cannot be informed, whether the Putrefaction be quicke or late, except you compare this Experiment with the like Experiment in another Yeare, it were not amisse, in the same Yeare, and at the same Time, to lay one Peece of Flesh, or Fish, in the Open Aire, and another of the same Kinde and Bignesse, within Doores: For I iudge, that if a generall Disposition be in the Aire to Putrefie, the Flesh, or Fish, will sooner Putrefie abroad, where the Aire hath more power, than in the House, where it hath lesse, being many wayes corrected. And this Experiment would be made about the End of March: For that Season is likest to discover, what the Winter hath done; And what the Summer following will doe vpon the Aire. And because the Aire (no doubt) receiveth great Tincture, and Infusion from the Earth; It were good to trie that Exposing of Flesh, or Fish, both vpon a Stake of Wood, some heighth above the Earth, and vpon the Flat of the Earth.

Take May-Dew, and see whether it putrefie quickly, or no? For that likewise may disclose the Qualitie of the Aire, and Vapour of the Earth, more or lesse Corrupted.

A Drie March, and a Drie May, portend a Wholesome Summer, if there be a Showring Aprill betweene; But otherwise, it is a Signe of a Pestilentiall Yeare.

As the Discovery of the Disposition of the Aire, is good for the Prognostickes of Wholesome, and Unwholesome Teares; So it is of much more vse, for the Choice of Places to dwell in: At the least, for Lodges, and Retiring Places for Health; (For Mansion Houses respect Promissions, as well

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as *Health*; Wherein the *Experiments* above mentioned may serue.

809

But for the *Choice* of *Places*, or *Seats*, it is good to make *Triall*, not onely of *Aptnesse* of *Aire* to corrupt, but also of the *Moisture* and *Driness* of the *Aire*; and the *Temper* of it, in *Heat*, or *Cold*; For that may concerne *Health* diuersly. We see that there be some *Houses*, wherein *Sweet Meats* will relent, and *Baked Meats* will mould, more than in others; And *Wainscots* will also sweat more; so that they will almost run with *Water*: All which, (no doubt,) are caused chiefly by the *Moistnesse* of the *Aire*, in those *Seats*. But because it is better to know it, before a *Man* buildeth his *House*, than to finde it after, take the *Experiments* following.

810

Lay *Wooll*, or a *Sponge*, or *Bread*, in the *Place* you would try, comparing it with some other *Places*; And see whether it doth not moisten, and make the *Wooll*, or *Sponge*, &c. more *Ponderous*, than the other? And if it doe, you may iudge of that *Place*, as Situate in a *Grosse*, and *Moist Aire*.

811

Because it is certaine, that in some *Places*, either by the *Nature* of the *Earth*, or by the *Situation* of *Woods*, and *Hills*, the *Aire* is more *Vnequall*, than in Others; And *Inequality* of *Aire* is euer an *Enemy* to *Health*; It were good to take two *Weather-Glasses*, Matches in all things, and to set them for the same *Houres* of One day, in seuerall *Places* where no *Shade* is, nor *Enclosures*: And to marke when you set them, how farre the *Water* commeth; And to compare them, when you come againe, how the *Water* standeth then: And if you finde them *Vnequall*, you may be sure that the *Place* where the *Water* is lowest, is in the *Warmer Aire*, and the other in the *Colder*. And the greater the *Inequality* bee, of the *Ascent*, or *Descent* of the *Water*, the greater is the *Inequality* of the *Temper* of the *Aire*.

812

The *Predictions* likewise of *Cold* and *Long Winters*, and *Hot* and *Dry Summers*, are good to be knowne; As well for the *Discovery* of the *Causes*, as for diuers *Provisions*. That of *Plenty* of *Hawes*, and *Heps*, and *Briar-Berries*, hath bene spoken of before. If *Wainscoat*, or *Stone*, that haue vsed to Sweat, be more dry, in the Beginning of *Winter*; Or the *Drops* of the *Eaues* of *Houses* come more slowly downe, than they vse; it portendeth a *Hard* and *Frosty Winter*. The *Cause* is, for that it sheweth an *Inclination* of the *Aire*, to *Dry Weather*; which in *Winter* is euer ioyned with *Frost*.

813

Generally, a *Moist* and *Cool Summer*, portendeth a *Hard Winter*. The *Cause* is, for that the *Vapours* of the *Earth*, are not dissipated in the *Summer* by the *Sunne*; And so they rebound vpon the *Winter*.

814

A *Hot* and *Dry Summer*, and *Autumne*, and especially if the *Heat* and *Drought* extend farre into *September*, portendeth an *Open Beginning* of *Winter*; And *Colds* to succeed, toward the latter Part of the *Winter*, and the Beginning of the *Spring*: For till then, the former *Heat* and *Drought* beare the *Sway*; And the *Vapours* are not sufficiently Multiplied.

815

An *Open* and *Warne Winter* portendeth a *Hot* and *Dry Summer*: For the *Vapours* disperse into the *Winter Showers*; Whereas *Cold* and *Frost* keepeth

keepeth them in, and transporteth them into the late *Spring*, and *Summer* following.

Birds that vse to change *Countries*, at certaine *Seasons*, if they come Earlier, doe shew the *Temperature* of *Weather*, according to that *Country* whence they came: As the *Winter-Birds*, (namely *Woodcockes*, *Feldsfares*, &c.) if they come earlier, and out of the *Northerne Countries*, with vs shew *Cold Winters*. And if it be in the same *Country*, then they shew a *Temperature* of *Season*, like vnto that *Season* in which they come: As *Swallowes*, *Bats*, *Cuckoos*, &c. that come towards *Summer*, if they come early, shew a *Hot Summer* to follow.

The *Prognostickes*, more Immediate, of *Weather* to follow soone after, are more Certaine than those of *Seasons*. The *Resounding* of the *Sea* vpon the *Shoare*; And the *Murmur* of *Winds* in the *Woods*, without apparent *Wind*; shew *Wind* to follow: For such *Winds*, breathing chiefly out of the *Earth*, are not at the first perceiued, except they be pent, by *Water*, or *Wood*. And therefore a *Murmur* out of *Canes* likewise portendeth as much.

The *Vpper Regions* of the *Aire*, perceiue the *Collection* of the *Matter* of *Tempest*, and *Winds*, before the *Aire* here below: And therefore the *Obscuring* of the *Smaller Starres* is a *Signe* of *Tempests* following. And of this kinde you shall finde a Number of *Instances* in our *Inquisition De Ventis*.

Great Mountaines haue a *Perception* of the *Disposition* of the *Aire* to *Tempests*, sooner than the *Valley's* or *Plaines* below: And therefore they say in *Wales*, when certaine *Hills* haue their *Night-Caps* on, they meane *Mischiefe*. The *Cause* is, for that *Tempests*, which are for the most Part bred aboue, in the *Middle Region*, (as they call it,) are soonest perceiued to collect in the *Places* next it.

The *Aire*, and *Fire*, haue *Subtill Perceptions* of *Wind Rising*, before *Men* finde it. We see the *Trembling* of a *Candle* will discover a *Wind* that otherwise we doe not feele; And the *Flexuous Burning* of *Flames* doth shew the *Aire* beginneth to be vnquiet; And so doe *Coales* of *Fire* by Casting off the *Ashes* more than they vse. The *Cause* is, for that no *Wind*, at the first, till it hath strooke and driuen the *Aire*, is Apparent to the *Sense*: But *Flame* is easier to moue, than *Aire*: And for the *Ashes*, it is no maruell, though *Wind* vnperceiued shake them off; For we vsually trie, which way the *Wind* bloweth, by casting vp *Grasse*, or *Chaffe*, or such light Things, into the *Aire*.

When *Wind* expireth from vnder the *Sea*; As it causeth some *Resounding* of the *Water*, (whereof we spake before,) so it causeth some *Light Motions* of *Bubbles*, and *White Circles* of *Froth*. The *Cause* is, for that the *Wind* cannot be perceiued by the *Sense*, vntill there be an *Eruption* of a great *Quantitie*, from vnder the *Water*; And so it getteth into a *Bodie*: Whereas in the first *Putting vp* it commeth in little *Portions*.

We spake of the *Ashes*, that *Coales* cast off; And of *Grasse*, and *Chaffe* carried by the *Wind*; So any *Light Thing* that moueth, when we finde no *Wind*.

816

817

818

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820

821

822

Wind, sheweth a *Wind* at hand: As when *Feathers*, or *Downe* of *Thistles*, fly to and fro in the *Aire*.

For *Prognostickes* of *Weather* from *Liuing Creatures*, it is to be noted; That *Creatures* that *Liue* in the *Open Aire*, (*Sub Diô*,) must needs haue a *Quicker Impression* from the *Aire*, than *Men* that *liue* most within *Doores*; And especially *Birds*, who *liue* in the *Aire*, *freest*, and *clearest*; And are aptest by their *Voyce* to tell *Tales*, what they finde; And likewise by the *Motion* of their *Flight* to expresse the same.

823

Water-Fowles, (as *Sea-Gulls*, *More-Hens*, &c.) when they *flocke* and fly together, from the *Sea* towards the *Shoares*; And contrariwise, *Land-Birds*, (as *Crowes*, *Swallowes*, &c.) when they fly from the *Land* to the *Waters*, and beat the *Waters* with their *Wings*; doe fore-shew *Raine*, and *Wind*. The *Cause* is, *Pleasure*, that both *Kindes* take in the *Moistnesse*, and *Density* of the *Aire*: And so desire to be in *Motion*, and vpon the *Wing*, whither soeuer they would otherwise goe: For it is no *Maruell*, that *Water-Fowle* doe ioy most in that *Aire*, which is likest *Water*; And *Land-Birds* also, (many of them,) delight in *Bathing*, and *Moist Aire*. For the same Reason also, many *Birds* doe proine their *Feathers*; And *Geese* doe gaggle; And *Crowes* seeme to call vpon *Raine*: All which is but the *Comfort* they seeme to receiue in the *Relenting* of the *Aire*.

824

The *Heron*, when shee soareth high, (so as sometimes shee is scene to passe ouer a *Cloud*,) sheweth *Winds*: But *Kites* flying aloft, shew *Faire* and *Drie Weather*. The *Cause* may be, for that they both mount most into the *Aire*, of that Temper, wherein they delight: And the *Heron*, being a *Water-Fowle*, taketh pleasure in the *Aire*, that is *Condensed*: And besides, being but *Heauie* of *Wing*, needeth the *Helpe* of the *Grosser Aire*. But the *Kite* affecteth not so much the *Grossenesse* of the *Aire*, as the *Cold* and *Freshnesse* thereof; For being a *Bird* of *Prey*, and therefore *Hot*, shee delighteth in the *Fresh Aire*; And (many times) flyeth against the *Wind*; As *Trouts*, and *Salmons* swimme against the *Streame*. And yet it is true also, that all *Birds* finde an *Ease* in the depth of the *Aire*; As *Swimmers* doe in a *Deepe Water*. And therefore when they are aloft, they can vphold themselues with their *Wings Spread*, scarce mouing them.

825

Fishes, when they play towards the *Top* of the *Water*, doe commonly foretell *Raine*. The *Cause* is, for that a *Fish* hating the *Drie*, will not approach the *Aire*, till it groweth *Moist*; And when it is *Drie*, will fly it, and swimme Lower.

826

Beasts doe take *Comfort*, (generally,) in a *Moist Aire*; And it maketh them eat their *Meat* better: And therefore *Sheepe* will get vp betimes in the *Morning*, to feed, against *Raine*: And *Castell*, and *Deere*, and *Conneyes*, will feed hard before *Raine*: And a *Heifer*, will put vp his *Nose*, and snuffe in the *Aire*, against *Raine*.

The

The *Trifoile*, against *Raine*, swelleth in the *Stalke*; and so standeth more vpright; For by *Wet*, *Stalkes* doe erect, and *Leaves* bow downe. There is a Small Red *Flower* in the *Stubble-Fields*, which Country People call the *Wincopipe*; Which if it open in the *Morning*, you may be sure of a faire *Day* to follow.

827

Euen in *Men*, *Aches*, and *Hurts*, and *Cornes*, doe engrieue, either towards *Raine*, or towards *Frost*: For the one maketh the *Humours* more to Abound; And the Other maketh them Sharper. So we see both *Extremes* bring the *Gout*.

828

Wormes, *Vermine*, &c. doe fore-shew (likewise) *Raine*: For *Earth-wormes* will come forth, and *Monles* will cast vp more, and *Fleas* bite more, against *Raine*.

829

Solide Bodies likewise fore-shew *Raine*. As *Stones*, and *Wainscot*, when they *Sweat*: And *Boxes*, and *Pegs* of *Wood*, when they Draw, and *Winde* hard; Though the Former be but from an Outward Cause; For that the *Stane*, or *Wainscot*, turneth and beateth backe the *Aire* against it selfe; But the latter is an *Inward Swelling* of the *Body* of the *Wood* it selfe.

830

Appetite is moued chiefly by Things that are *Cold*, and *Drie*: The Cause is, for that *Cold* is a Kinde of *Indigence* of *Nature*, and calleth vpon Supply; And so is *Drinesse*: And therefore all *Soure Things*, (as *Vinegar*, *Iuyce* of *Limons*, *Oyle* of *Vitrioll*, &c.) prouoke *Appetite*. And the *Disease*, which they call *Appetitus Caninus*, consisteth in the *Matter* of an *Acide* & *Glassie Flegme*, in the *Mouth* of the *Stomach*. *Appetite* is also moued by *Soure Things*; For that *Soure Things*, induce a *Contraction* in the *Nerves*, placed in the *Mouth* of the *Stomach*; Which is a great Cause of *Appetite*. As for the Cause, why *Onions*, and *Salt*, and *Pepper*, in Baked Meats, moue *Appetite*, it is by *Vellication* of those *Nerves*; For *Motion* whetters. As for *Worme-wood*, *Oliues*, *Capers*, and others of that kinde, which participate of *Bitternesse*, they moue *Appetite* by *Absterision*. So as there be foure Principall Causes of *Appetite*; The *Refrigeration* of the *Stomach*, ioyned with some *Drinesse*; *Contraction*; *Vellication*; And *Absterision*: Besides *Hunger*, which is an *Emptinesse*: And yet *Over-Fasting* doth (many times) cause the *Appetite* to cease; For that *Want* of *Meat* maketh the *Stomach* draw *Humours*; And such *Humours* as are *Light*, and *Cholericke*, which quench *Appetite* most.

Experiment
Solitary, touching the Nature of Appetite in the Stomach.

831

It hath been obserued by the *Ancients*, that where a *Rain-Bow* seemeth to hang ouer, or to touch, there breatheth forth a *Sweet Smell*. The Cause is, for that this happeneth but in certaine Matters, which haue in them selues some *Sweetnesse*; Which the *Gentle Dew* of the *Raine-Bow* doth draw forth: And the like doe *Soft Showers*; For they also make the *Grounds* Sweet: But none are so delicate as the *Dew* of the *Rain-Bow*, where it falleth. It may be also, that the *Water* it selfe hath some *Sweetnesse*: For the *Raine-Bow* consisteth of a *Glomeration* of *Small Drops*, which cannot possibly fall, but from the *Aire*, that is very *Low*: And there-

Experiment
Solitary, touching Sweetnesse of Odour from the Raine-bow.

832

therefore may hold the very *Sweetnesse* of the *Herbs*, and *Flowers*, as a *Distilled Water*: For *Raine*, and other *Dew*, that fall from high, cannot preferue the *Smell*, being dissipated in the drawing vp: Neither doe we know, whether some *Water* it selfe, may not haue some degree of *Sweetnesse*. It is true, that we finde it sensibly in no *Poole*, *Riuer*, nor *Fountaine*; But good *Earth*, newly turned vp, hath a *Freshnesse*, and good *Sent*; Which *water*, if it be not too *Equall*, (For *Equall Obiects* neuer moue the *Sense*,) may also haue. Certaine it is, that *Bay-Salt*, which is but a kinde of *Water Congealed*, will sometimes smell like *Violets*.

Experiment
Solitary tou-
ching Sweet
Smells.

833

TO *Sweet Smells* *Heat* is requisite, to Concoct the *Matter*; And some *Moisture* to Spread the *Breath* of them. For *Heat*, we see that *Woods*, and *Spices*, are more *Odorate* in the *Hot Countries*, than in the *Cold*: For *Moisture*, we see that Things too much *Dried*, lose their *Sweetnesse*: And *Flowers* growing, smell better in a *Morning*, or *Euening*, than at *Noone*. Some *Sweet Smells* are destroyed by Approach to the *Fire*; As *Violets*, *Wall-Flowers*, *Gilly-Flowers*, *Pinckes*; And generally all *Flowers* that haue *Coole* and *Delicate Spirits*. Some continue both on the *Fire*, and from the *Fire*, As *Rose-Water*, &c. Some doe scarce come forth, or at least not so pleasantly, as by meanes of the *Fire*; as *Iuniper*, *Sweet Gums*, &c. And all *Smells*, that are Enclosed in a *Fast Body*: But (generally) those *Smells* are the most *Gratefull*, where the *Degree* of *Heat* is *Small*; Or where the *Strength* of the *Smell* is allayed; For these *Things* doe rather wooc the *Sense*, than Satiare it. And therefore the *Smell* of *Violets*, and *Roses*, exceedeth in *Sweetnesse* that of *Spices*, and *Gummes*; And the Strongest Sort of *Smells*, are best in a weft, a farre off.

Experiment
Solitary tou-
ching the Cor-
poreall Substance
of Smells.

834

IT is certaine, that no *Smell* issueth, but with *Emission* of some *Corporeall Substance*; Not as it is in *Light*, and *Colours*, and in *Sounds*. For we see plainly, that *Smell* doth spread nothing that distance, that the other doe. It is true, that some *Woods* of *Orenges*, and *Heathes* of *Rose-Mary*, will Smell a great way into the *Sea*, perhaps twenty Miles; But what is that, since a *Peale* of *Ordnance* will doe as much, which moueth in a small compasse? Whereas those *Woods*, and *Heathes*, are of *Vast Spaces*: Besides wee see that *Smells* doe adhere to *Hard Bodies*; As in *Perfuming* of *Gloues*, &c. which sheweth them *Corporeall*; And doe Last a great while, which *Sounds*, and *Light* doe not.

Experiment
Solitary tou-
ching Fetide
and Fragrant
Odours.

835

THe *Excrements* of most *Creatures* Smell ill; Chiefly to the same *Creature* that voideth them: For we see, besides that of *Man*, that *Pigeons*, and *Horses* thrive best, if their *Houses*, and *Stables* be kept Sweet; And so of *Cage-Birds*: And the *Cat* burieth that which shee voydeth: And it holdeth chiefly in those *Beasts*, which feed vpon *Flesh*. *Dogs* (almost) onely of *Beasts*, delight in *Fetide Odours*; Which sheweth there is somewhat in their *Sense* of *Smell*, differing from the *Smells* of other *Beasts*. But the *Cause*, why *Excrements* smell ill, is manifest; For that the

Body

Body it selfe reiected them; Much more the *Spirits*: And we see, that those *Excrements*, that are of the *First Digestion*, Smell the worst; As the *Excrements* from the *Belly*: Those that are from the *Second Digestion*, lesse ill; As *Urine*; And those that are from the *Third*, yet lesse; For *Sweat* is not so bad, as the other two; Especially of some *Persons*, that are full of *Heat*. Likewise most *Putrefactions* are of an *Odious Smell*: For they smelleither *Fetide*, or *Mouldy*. The *Cause* may be, for that *Putrefaction* doth bring forth such a *Consistence*, as is most *Contrary* to the *Consistence* of the *Body*, whilst it is *Sound*: For it is a meere dissolution of that *Forme*. Besides, there is another *Reason* which is *Profound*: And it is that the *Objects* that please any of the *Senses*, haue (all) some *Equality*, and (as it were) *Order*, in their *Composition*: But where those are wanting, the *Object* is euer *Ingrate*. So *Mixture* of many *Disagreeing Colours* is euer vnpleasant to the *Eye*: *Mixture* of *Discordant Sounds* is vnpleasant to the *Eare*: *Mixture*, or *Hotch-Potch* of many *Tastes*, is vnpleasant to the *Taste*: *Harshnesse* and *Ruggednesse* of *Bodies*, is vnpleasant to the *Touch*: Now it is certaine, that all *Putrefaction*, being a *Dissolution* of the first *Forme*, is a meere *Confusion*, and *Unformed Mixture* of the *Parts*. Neuerthelesse, it is strange, and seemeth to *Crosse* the former *Observation*, that some *Putrefactions* and *Excrements* doe yeeld *Excellent Odours*; As *Civet* and *Muske*; And as some thinke *Amber-Greece*: For diuers take it, (though vnprobably) to come from the *Sperme* of *Fish*: And the *Mosse* we spake of from *Apple-Trees*, is little better than an *Excretion*. The *Reason* may be, for that there passeth in the *Excrements*, and remaineth in the *Putrefactions*, some good *Spirits*; especially where they proceed from *Creatures*, that are very *Hot*. But it may be also ioyned with a further *Cause*, which is more *Subtill*; And it is, that the *Senses* loue not to be *Ouerpleased*; But to haue a *Commixture* of somewhat that is in it selfe *Ingrate*. Certainly, we see how *Discords* in *Musicke*, falling vpon *Concords*, make the *Sweetest Straines*: And we see againe, what *Strange Tastes* delight the *Taste*; As *Red-Herrings*, *Cauery*, *Parmizan*, &c. And it may be, the same holdeth in *Smels*. For those kinde of *Smels*, that we haue mentioned, are all *Strong*, and doe *Pill* and *Vellicate* the *Sense*. And wee finde also, that *Places* where Men *Urine*, commonly haue some *Smell* of *Violets*: And *Urine*, if one hath eaten *Nutmeg*, hath so too.

The Sloathfull, Generall, and Indefinite *Contemplations*, and *Notions*, of the *Elements*, and their *Coniugations*; Of the *Influences* of *Heauen*; Of *Heat*, *Cold*, *Moisture*, *Drought*; *Qualities* *Active*, *Passiue*; And the like; haue swallowed vp the true *Passages*, and *Processes*, and *Affects*, and *Consistences* of *Matter*, and *Naturall Bodies*. Therefore they are to be set aside, being
T but

but *Notionall*, and *ill Limited*; And *Definite Axiomes* are to be drawne out of *Measured Instances*: And so Assent to bee made to the more *Generall Axiomes*, by *Scale*. And of these *Kindes of Processes of Natures*, and *Characters of Matter*, we will now set downe some *Instances*.

Experiment
Solitary, tou-
ching the Cau-
ses of Putrefa-
ction.

836

ALL *Putrefactions* come chiefly from the *Inward Spirits* of the *Bodys*; And partly also from the *Ambient Body*, be it *Aire*, *Liquor*, or what-
soever else. And this last, by two *Meanes*: Either by *Ingresse* of the *Sub-
stance* of the *Ambient Body*, into the *Body Putrified*; Or by *Excitation* and
Sollicitation of the *Body Putrified*, and the *Parts* thereof, by the *Body Am-
bient*. As for the *Receiued Opinion*, that *Putrefaction* is caused, either
by *Cold*, or *Peregrine* and *Preternaturall Heat*, it is but *Nugation*: For
Cold in *Things Inanimate*, is the greatest Enemy that is, to *Putrefaction*;
though it extinguisheth *Vinification*, which euer consisteth in *Spirits At-
tenuate*, which the *Cold* doth congeale, and coagulate. And as for the
Peregrine Heat, it is thus farre true; That if the *Proportion* of the *Aduen-
tine Heat*, be greatly *Predominant*, to the *Naturall Heat*, and *Spirits* of
the *Body*, it tendeth to *Dissolution*, or *Notable Alteration*. But this is
wrought by *Emission*, or *Suppression*, or *Suffocation*, of the *Native Spirits*;
And also by the *Disordination*, and *Discomposure* of the *Tangible Parts*;
And other *Passages of Nature*; And not by a *Conflict* of *Heats*.

Experiment
Solitary tou-
ching Bodies
Vnperfectly
Mixt.

837

IN *Versions*, or *Maine Alterations* of *Bodies*, there is a *Medium* betweene
the *Body*, as it is at first, and the *Body Resulting*; which *Medium* is *Cor-
pus imperfectè Mistum*, and is *Transitory*, and not durable; As *Mists*,
Smoaks, *Vapours*, *Chylus* in the *Stomach*, *Living Creatures* in the first *Vini-
fication*: And the *Middle Action*, which produceth such *Imperfect Bodies*,
is fitly called (by some of the *Ancients*) *Inquination*, or *Inconcoction*, which
is a *Kinde of Putrefaction*; For the *Parts* are in *Confusion*, till they settle,
one way, or other.

Experiment
Solitary tou-
ching Concocti-
on and Crudity.

838

THe word *Concoction*, or *Digestion*, is chiefly taken into vse from *Li-
ving Creatures*, and their *Organs*; And from thence extended to *Li-
quors*, and *Fruits*, &c. Therefore they speake of *Meat Concocted*; *Vrine* and
Excrements Concocted; And the *Four Digestions*, (In the *Stomach*; In the
Liuor; In the *Arteries* and *Nerves*; And in the *Generall Parts* of the *Bo-
dy*;) are likewise called *Concoctions*: And they are all made to bee the
Workes of Heat: All which *Notions* are but ignorant *Catches* of a few
Things, which are most *Obuious* to *Mens Observations*. The *Constan-
test Notion* of *Concoction* is, that it should signifie the *Degrees* of *Altera-
tion*, of one *Body* into another, from *Crudity* to perfect *Concoction*; Which
is the *Vltimity* of that *Action* or *Processe*: And while the *Body* to be *Con-
uerted* and *Altered*, is too strong for the *Efficient*, that should *Conuert*, or
Alter it, (whereby it resisteth and holdeth fast in some degree the first
Forme,

Forme, or Consistence) it is (all that while) *Crude, and Inconcoct*; And the *Processe* is to be called *Crudity and Inconcoction*. It is true, that *Concoction* is, in great part, the *Worke of Heat*; But not the *Worke of Heat* alone: For all Things, that further the *Conversion, or Alteration*, (as *Rest, Mixture of a Body already Concocted, &c.*) are also *Meanes to Concoction*. And there are of *Concoction* two *Periods*; The one *Assimilation, or Absolute Conversion and Subaction*; The other *Maturation*: whereof the Former is most conspicuous in the *Bodies of Living Creatures*; In which there is an *Absolute Conversion, and Assimilation* of the *Nourishment* into the *Body*: And likewise in the *Bodies of Plants*: And againe in *Metals*, where there is a full *Transmutation*. The other (which is *Maturation*) is seene in *Liquors, and Fruits*; wherein there is not desired; nor pretended, an viter *Conversion*, but only an *Alteration* to that *Forme*, which is most sought, for *Mans vse*; As in *Clarifying of Drinkes*; *Ripening of Fruits, &c.* But note, that there be two *Kindes of Absolute Conversions*; The one is, when a *Body* is converted into another *Body*, which was before; As when *Nourishment* is turned into *Flesh*; That is it which we call *Assimilation*. The other is, when the *Conversion* is into a *Body* meerely New, and which was not before; As if *Silver* should be turned to *Gold*; or *Iron* to *Copper*: And this *Conversion* is better called, for distinctions sake, *Transmutation*.

There are also diuers other *Great Alterations of Matter, and Bodies*, besides those that tend to *Concoction, and Maturation*; For whatsoever doth so alter a *Body*, as it returneth not againe to that it was, may be called *Alteratio Maior*: As when *Meat* is Boiled, or Roasted, or Fried, &c. Or when *Bread and Meat* are Baked; Or when *Cheese* is made of *Curds, or Butter of Creame, or Coales of Wood, or Bricks of Earth*; And a Number of others. But to apply *Notions Philosophicall* to *Plebeian Termes*; Or to say, where the *Notions* cannot fitly be reconciled, that there wanteth a *Terme, or Nomenclature* for it; (as the *Ancients* vsed;) They be but *Shifts of Ignorance*; For *Knowledge* will be euer a *Wandering and Indigested Thing*, if it be but a *Commixture* of a few *Notions*, that are at hand and occure, and not excited from sufficient Number of *Instances*, and those well collated.

The *Consistences of Bodies* are very diuers: *Dense, Rare; Tangible, Pneumaticall, Volatile, Fixed; Determinate, Not Determinate; Hard, Soft; Cleauing, Not Cleauing; Congealeable, Not Congealeable; Liquefiable, Not Liquefiable; Fragile, Tough; Flexible, Inflexible; Tractile, or to be drawne forth in length, Intractile; Porous, Solid; Equall, and Smooth, Vnequall; Venous, and Fi-*

Experiment
Solitary tou-
ching *Alterati-*
ons, which may
bee called
Maiors.

839

brows, and with Graines, Entire; And diuers Others; All which to referre to *Heat*, and *Cold*; and *Moisture*, and *Drought*, is a Compendious and Inutile Speculation. But of these see principally our *Abecedarium Naturæ*; And otherwise *Sparsim* in this our *Sylua Sylvarum*: Neuerthelesse in some good part, We shall handle diuers of them now presently.

Experiment
Solitary, tou-
ching Bodies Li-
quefiable, and
not Liquefiable.

840

Liquefiable, and Not Liquefiable, proceed from these Causes: *Liquefaction* is euer caused by the Detention of the Spirits, which play within the Body, and Open it. Therefore such Bodies as are more Turgide of Spirit; Or that haue their Spirits more Straitly Imprisoned; Or againe that hold them Better Pleased, and Content; are Liquefiable: For these three Dispositions of Bodies, doe arrest the Emission of the Spirits. An Example of the first two Properties is in Metals; And of the Last in Grease, Pitch, Sulphure, Butter, Wax, &c. The Disposition not to Liquefie proceedeth from the Easie Emission of the Spirits, whereby the Groesser Parts contract; And therefore, Bodies leiuue of Spirits; Or which part with their Spirits more Willingly; are not Liquefiable; As Wood, Clay, Free-Stone, &c. But yet, euen many of those Bodies, that will not Melt, or will hardly Melt, will notwithstanding Soften; As Iron in the Forge; And a Sticke bathed in Hot Ashes, which thereby becommeth more Flexible. Moreouer, there are some Bodies, which doe Liquefie, or dissolue by Fire; As Metals, Wax, &c. And other Bodies, which dissolue in Water; As Salt, Sugar, &c. The Cause of the former proceedeth from the Dilatation of the Spirits by Heat: The Cause of the Latter proceedeth from the Opening of the Tangible Parts, which desire to receiue the Liqueur. Again, there are some Bodies, that dissolue with both; As Gumme, &c. And those be such Bodies, as on the One Side haue good store of Spirit; And on the other Side, haue the Tangible Parts Indigent of Moisture; For the former helpeth to the Dilating of the Spirits by the Fire; And the Latter stimulateth the Parts to Receiue the Liqueur.

Experiment
Solitary, tou-
ching Bodies
Fragile, and
Tough.

841

OF Bodies, some are Fragile; And some are Tough, and Not Fragile; And in the Breaking, some Fragile Bodies break but where the Force is; Some shatter and fly in many Peeeces. Of Fragility the Cause is an Impotency to be Extended: And therefore Stone is more Fragile than Metall; And so Ficile Earth is more Fragile than Crude Earth; And Dry Wood than Greene. And the Cause of this Vnapinesse to Extension, is the Small Quantity of Spirits; (For it is the Spirit that furthereth the Extension or Dilatation of Bodies;) And it is euer Concomitant with Porosity, and with Driness in the Tangible Parts: Contrariwise, Tough Bodies haue more Spirit, and fewer Pores, and Moister Tangible Parts: Therefore we see that Parchment, or Leather will stretch, Paper will not; Woollen Closh will tenter, Linnen scarcely.

All

ALL *Solid Bodies* consist of *Parts* of two severall *Natures*; *Pneumaticall*, and *Tangible*; And it is well to be noted, that the *Pneumaticall Substance* is in some *Bodies*, the *Native Spirit* of the *Body*; And in some other, plaine *Aire* that is gotten in; As in *Bodies Desiccate*, by *Heat*, or *Age*: For in them, when the *Native Spirit* goeth forth, and the *Moisture* with it, the *Aire* with time getteth into the *Pores*. And those *Bodies* are ever the more *Fragile*; For the *Native Spirit* is more *Yeelding*, and *Extensive*, (especially to follow the *Parts*,) than *Aire*. The *Native Spirits* also admit great *Diversity*; As *Hot*, *Cold*, *Active*, *Dull*, &c. Whence proceed most of the *Vertues*, and *Qualities* (as wee call them) of *Bodies*: But the *Aire Intermixt*, is without *Vertues*, and maketh Things *Inspide*, and without any *Extimulation*.

Experiment
Solitary touching the Two
Kinds of *Pneumatics* in *Bodies*.

842

THE *Concretion* of *Bodies* is (commonly) solued by the *Contrary*; As *Ice*, which is congealed by *Cold*, is dissolued by *Heat*; *Salt* and *Sugar*, which are Excocted by *Heat*, are Dissolued by *Cold*, and *Moisture*. The *Cause* is, for that these *Operations*, are rather *Returns* to their former *Nature*, than *Alterations*: So that the *Contrary* cureth. As for *Oyle*, it doth neither easily congeale with *Cold*, nor thicken with *Heat*. The *Cause* of both *Effects*, though they be produced by *Contrary Efficients*, seemeth to be the Same; And that is, because the *Spirit* of the *Oyle*, by either *Meanes*, exhalet little; For the *Cold* keepeth it in; and the *Heat*, (except it be *Vehement*,) doth not call it forth. As for *Cold*, though it take hold of the *Tangible Parts*, yet as to the *Spirits*, it doth rather make them *Swell*, than *Congeale* them: As when *Ice* is congealed in a *Cup*, the *Ice* will *Swell* in stead of *Contracting*; And sometimes *Rift*.

Experiment.
Solitary touching *Concretion*, and *Dissolution* of *Bodies*.

843

OF *Bodies*, some (we see) are *Hard*, and some *Soft*: The *Hardnesse* is caused (chiefly) by the *Leinenesse* of the *Spirits*; And their *Imparity* with the *Tangible Parts*: Both which, if they be in a greater degree, maketh them not only *Hard*, but *Fragile*, and lesse *Enduring* of *Pressure*; As *Steele*, *Stone*, *Glasse*, *Dry Wood*, &c. *Softnesse* commeth (contrariwise) by the Greater *Quantity* of *Spirits*; (which ever helpeth to *Induce Yeelding* and *Cession*;) And by the more *Equall Spreading* of the *Tangible Parts*, which thereby are more *Sliding*, and *Following*; As in *Gold*, *Lead*, *Wax*, &c. But note that *Soft Bodies*, (as we use the word,) are of two *Kinds*; The one, that easily giueth place to another *Body*, but altereth not *Bulke*, by *Rising* in other *Places*: And therefore we see that *Wax*, if you put any Thing into it, doth not rise in *Bulke*, but only giueth *Place*: For you may not thinke, that in *Printing* of *Wax*, the *Wax* riseth vp at all; But only the *depressed Part* giueth place, and the other remaineth as it was. The other, that altereth *Bulke* in the *Cession*; As *Water*, or other *Liquors*, if you put a *Stone*, or any Thing into them, they giue place (indeed) easily, but then they rise all over: Which is a *False Cession*; For it is in *Place*, and not in *Body*.

Experiment
Solitary touching *Hard* and *Soft Bodies*.

844

Experiment
Solitary tou-
ching Bodies
Ductile, and
Tensile.

849

ALL Bodies *Ductile*, and *Tensile*, (as *Metals* that will be drawne into *Wires*; *Wooll* and *Tow* that will be drawn into *Yarne*, or *Thred*) haue in them the *Appetite* of *Not Discontinuing*, Strong; Which maketh them follow the Force, that pulleth them out; And yet so, as not to *Discontinue* or forsake their owne Body. *Viscous Bodies*, (likewise) as *Pitch*, *Wax*, *Bird-Lime*, *Cheese* toasted, will draw forth, and rope. But the difference betweene *Bodies Fibrous*, and *Bodies Viscous*, is Plaine; For all *Wooll*, and *Tow*, and *Cotton*, and *Silke*, (especially raw *Silke*) haue, besides their Desire of *Continuance*, in regard of the *Tenuity* of their *Thred*, a *Greedinesse* of *Moisture*; And by *Moisture* to ioyne and incorporate with other *Thred*; Especially if there be a little *Wreathing*; As appeareth by the *Twisting* of *Thred*; And the *Practise* of *Twirling* about of *Spindles*. And we see also, that *Gold* and *Siluer Thred* cannot bee made without *Twisting*.

Experiment
Solitary tou-
ching other
Passions of Mat-
ter, and Chara-
cters of Bodies.

846

THe Differences of *Impressible* and *Not Impressible*; *Figurable* and *Not Figurable*; *Mouldable* and *Not Mouldable*; *Scissile* and *Not Scissile*; And many other *Passions* of *Matter*, are *Plebeian Notions*, applied vnto the *Instruments* and *Vses* which Men ordinarily practise; But they are all but the *Effects* of some of these *Causes* following; Which we will Enumerate without Applying them, because that would be too long. The First is the *Cession*, or *Not Cession* of *Bodies*, into a *Smaller Space* or *Roome*, keeping the *Outward Bulke*, and not flying vp. The Second is the *Stronger* or *Weaker Appetite*, in *Bodies*, to *Continuity*, and to flie *Discontinuitie*. The Third is the *Disposition* of *Bodies*, to *Contract*, or *Not Contract*; And againe, to *Extend*, or *Not Extend*. The Fourth is the *Small Quantity*, or *Great Quantity*, of the *Pneumaticall* in *Bodies*. The Fifth is the *Nature* of the *Pneumaticall*, whether it bee *Natiue Spirit* of the *Body*, or *Common Aire*. The Sixth is, the *Nature* of the *Natiue Spirits* in the *Body*, whether they be *Active* and *Eager*, or *Dull* and *Gentle*. The Seuen is the *Emission* or *Detention* of the *Spirits* in *Bodies*. The Eighth is the *Dilatation*, or *Contraction* of the *Spirits* in *Bodies*, while they are detained. The Ninth is the *Collocation* of the *Spirits* in *Bodies*; whether the *Collocation* be *Equall*, or *Vnequall*; And againe, whether the *Spirits* be *Conseruate*, or *Diffused*. The Tenth is the *Density*, or *Raritie* of the *Tangible Parts*. The Eleuenth is the *Equality* or *Inequality* of the *Tangible Parts*. The Twelfth is the *Disgestion*, or *Crudity* of the *Tangible Parts*. The Thirteenth is the *Nature* of the *Matter*, whether *Sulphureous* or *Mercuriall*, *Watric* or *Oilie*, *Drie* and *Terrestriall*, or *Moist* and *Liquid*; which *Natures* of *Sulphureous* and *Mercuriall*, seeme to be *Natures Radicall*, and *Principall*. The Fourteenth is the *Placing* of the *Tangible Parts*, in *Length*, or *Transuerse*; (as it is in the *Warpe*, and the *Woofe* of *Textiles*;) *More Inward*, or *More Outward*; &c. The Fifteenth is the *Porosity*, or *Imporosity* betwixt the *Tangible Parts*; And the *Greatnesse*, or *Smalnesse* of the *Pores*. The Sixteenth is the *Collocation* and *Posture* of the *Pores*. There may be more *Causes*; but these doe occurre for the Present.

Take

Take *Lead*, and melt it, and in the midst of it, when it beginneth to congeale, make a little Dint, or Hole, and put *Quick-silver* wrapped in a Peece of *Linnen* into that Hole, and the *Quick-silver* will fix, and runne no more, and endure the Hammer. This is a Noble Instance of *Induration*, by Consent of one Body with another, and Motion of *Excitation* to *Imitate*; For to ascribe it only to the *Vapour* of *Lead*, is lesse Probable. *Quare* whether the *Fixing* may be in such a degree, as it will be Figured like other *Metalls*? For if so, you may make Workes of it for some purposes, so they come not neare the *Fire*.

Experiment
Solitary tou-
ching *Indurati-*
on by *Sympathy*.

847

Sugar hath put downe the vse of *Honey*; In so much as wee haue lost those *Observations*, and *Preparations* of *Honey*, which the *Ancients* had, when it was more in Price. First, it seemeth that there was, in old time, *Tree-Honey*, as well as *Bee-Honey*; Which was the *Teare* or *Bloud* issuing from the *Tree*: In so much as one of the *Ancients* relateth, that in *Trebi-sond*, there was *Honey* issuing from the *Box-Trees*, which made *Men Mad*. Again, in Ancient time, there was a Kinde of *Honey*, which either of the owne Nature, or by Art, would grow as Hard as *Sugar*; And was not so Lushious as Ours. They had also a *Wine* of *Honey*, which they made thus. They crushed the *Honey* into a great *Quantitie* of *Water*, and then strained the *Liquor*; After they boyled it in a Copper to the halfe: Then they powred it into *Earthen Vessels*, for a small time; And after tunned it into *Vessels* of *Wood*, and kept it for many yeares. They haue also, at this day, in *Russia*, and those *Northerne Countries*, *Mead Simple*, which (well made, and seasoned) is a good wholesome *Drinke*, and very Cleare. They vse also in *Wales*, a Compound *Drinke* of *Mead*, with *Herbs*, and *Spices*. But meane-while it were good, in recompence of that wee haue lost in *Honey*, there were brought in vse a *Sugar-Mead*, (for so we may call it,) though without any *Mixture* at all of *Honey*; And to brew it, and keepe it stale, as they vse *Mead*; For certainly, though it would not be so *Abster-sive*, and *Opening*, and *Solutiue* a *Drinke*, as *Mead*; yet it will be more gratefull to the *Stomach*, and more *Lenitiue*, and fit to be vsed in *Sharpe Diseases*: For we see, that the vse of *Sugar* in *Beere*, and *Ale*, hath good *Effects* in such Cases.

Experiment
Solitary tou-
ching *Honey*
and *Sugar*.

848

It is reported by the *Ancients*, that there was a Kinde of *Steele*, in some places, which would polish almost as white and bright as *Silver*. And that there was in *India* a Kinde of *Brasse*, which (being polished) could scarce be discerned from *Gold*. This was in the *Natural* *Vre*; But I am doubtfull, whether Men haue sufficiently refined *Mesalls*, which wee count *Base*; As whether *Iron*, *Brasse*, and *Tin*, be refined to the Heighth? But when they come to such a Finenesse, as serueth the ordinary vse, they trie no further.

Experiment
Solitary tou-
ching the *Finer*
Sort of *Base*
Metalls.

849

There haue beene found certaine *Cements* vnder *Earth*, that are very Soft; And yet, taken forth into the *Sun*, harden as Hard as *Marble*:

Experiment
Solitary, tou-
ching *Cements*
and *Quarries*.

There

850

There are also ordinary *Quarries* in *Somerset-Shire*, which in the *Quarry* cut soft to any Bignesse, and in the *Building* prove firme, and hard.

Experiment
Solitary touch-
ing the Al-
tering of the Co-
lour of Haires
and Feathers.

851

Living Creatures (generally) doe change their *Haire* with *Age*, turning to be *Gray* and *White*: As is scene in *Men*, though some Earlier, some Later; In *Horses*, that are Dappled, and turne *White*; In *Old Squirrels*, that turne *Grisly*; And many others. So doe some *Birds*; As *Cygnets*, from *Gray* turne *White*; *Hawkes*, from *Browne* turne more *White*: And some *Birds* there be, that vpon their *Moulting*, doe turne *Colour*; As *Robin-Redbreasts*, after their *Moulting*, grow to be *Red* againe, by degrees; So doe *Gold-Finches* vpon the *Head*. The cause is, for that *Moisture* doth (chiefly) colour *Haire*, and *Feathers*; And *Drinesse* turneth them *Gray* and *White*; Now *Haire* in *Age* waxeth *Drier*: So doe *Feathers*. As for *Feathers*, after *Moulting*, they are *Young Feathers*, and so all one as the *Feathers* of *Young Birds*. So the *Beard* is younger than the *Haire* of the *Head*, and doth (for the most part,) wax *Hoare* later. Out of this Ground, a *Man* may deuise the *Meanes* of *Altering* the *Colour* of *Birds*, and the *Retardation* of *Hoare-Haires*. But of this see in the fifth *Experiment*.

Experiment
Solitary touch-
ing the Dif-
ferences of Li-
uing Creatures,
Male and Fe-
male.

852

THe Difference betweene *Male* and *Female*, in some *Creatures*, is not to be discerned, otherwise than in the *Parts* of *Generation*: As in *Horses* and *Mares*, *Dogges* and *Bitches*, *Doues* *He* and *She*, and others. But some differ in *Magnitude*, and that diuersly; For in most the *Male* is the greater; As in *Man*, *Pheasants*, *Peacocks*, *Turkey's*; and the like: And in some few, as in *Hawkes*, the *Female*. Some differ in the *Haire*, and *Feathers*, both in the *Quantitie*, *Crispation*, and *Colours* of them; As *He-Lions* are *Hirsute*, and haue great *Maines*; The *She's* are smooth like *Cats*. *Bulls* are more *Crispe* vpon the *Fore-head* than *Cowes*; The *Peacocke*, and *Pheasant-Cocke*, and *Gold-Finch-Cocke*, haue glorious and fine *Colours*; The *Henn's* haue not. Generally, the *Hees* in *Birds* haue the fairest *Feathers*. Some differ in diuers *Features*; As *Buckes* haue *Hornes*, *Doe's* none; *Rammes* haue more *wreathed Hornes* than *Ewes*; *Cockes* haue great *Combes* and *Spurres*, *Hens* little or none; *Boares* haue great *Fangs*, *Sowes* much lesse; The *Turky-Cocke* hath great and *Swelling Gills*, the *Hen* hath lesse; *Men* haue generally *Deeper* and *Stronger Voyces* than *Women*. Some differ in *Facultie*; As the *Cockes* amongst *Singing Birds*, are the best *Singers*. The *Chiefe Cause* of all these, (no doubt,) is, for that the *Males* haue more *Strength* of *Heat* than the *Females*; Which appeareth manifestly in this, that all young *Creatures* *Males*, are like *Females*; And so are *Eunuchs*, and *Gels* *Creatures* of all kindes, liker *Females*. Now *Heat* causeth *Greatnesse* of *Growth*, generally, where there is *Moisture* enough to worke vpon: But if there be found in any *Creature*, (which is scene rarely,) an *Ouer-great Heat* in proportion to the *Moisture*, in them the *Female* is the greater; As in *Hawkes*, and *Sparrowes*. And if the *Heat* be ballanced with the *Moisture*, then there is no difference to be scene betweene *Male* and *Female*:

male: As in the *Instances* of *Horses*, and *Dogges*. We see also, that the *Hornes* of *Oxen*, and *Cowes*, for the most part, are Larger than the *Bulls*; which is caused by abundance of *Moisture*, which in the *Hornes* of the *Bull* faileth. Againe, *Heat* causeth *Pilosity*, and *Crispation*; And so likewise *Beards* in *Men*. It also expelleth finer *Moisture*, which Want of *Heat* cannot Expell: And that is the *Cause* of the *Beauty* and *Variety* of *Feathers*: Againe, *Heat* doth put forth many *Excrescences*, and much Solide *Matter*, which Want of *Heat* cannot do: And this is the *Cause* of *Hornes*, and of the *Greatnesse* of them; And of the *Greatnesse* of the *Combes* and *Sprres* of *Cockes*, *Gills* of *Turky-Cockes*, and *Fangs* of *Boares*. *Heat* also dilateth the *Pipes*, and *Organs*, which causeth the *Deepenesse* of the *Voice*. Againe, *Heat* refineth the *Spirits*, and that causeth the *Cock-Singing Bird*, to Excell the *Hen*.

T Here be *Fishes* greater than any *Beasts*; As the *Whale* is farre greater than the *Elephant*. And *Beasts* are (generally) greater than *Birds*. For *Fishes*, the cause may be, that because they Liue not in the *Aire*, they haue not their *Moisture* drawn and Soaked by the *Aire*, and *Sun-Beames*. Also they rest alwayes, in a manner, and are supported by the *Water*; whereas *Motion* and *Labour* doe consume. As for the *Greatnesse* of *Beasts*, more than of *Birds*, it is caused, for that *Beasts* stay Longer time in the *Wombe*, than *Birds*, and there Nourish, and Grow; Whereas in *Birds*, after the *Egge* Lay'd, there is no further *Growth*, or *Nourishment* from the *Female*: For the *Sitting* doth *Vinifie*, and not Nourish.

W E haue partly touched before the *Meanes* of *Producing Fruits*, without *Coares*, or *Stones*. And this we adde further, that the *Cause* must be *Abundance* of *Moisture*; For that the *Coare*, and *Stone* are made of a *Drie Sap*: And we see that it is possible, to make a *Tree* put forth only in *Blossome*, without *Fruit*; As in *Cherries* with *Double Flowers*; Much more into *Fruit* without *Stone*, or *Coares*. It is reported, that a *Cions* of an *Apple*, grafted vpon a *Colewort-Stalke*, sendeth forth a great *Apple* without a *Coare*. It is not vnlikely, that if the *Inward Pith* of a *Tree*, were taken out, so that the *Iuyce* came only by the *Barke*, it would work the *Effect*. For it hath beene obserued, that in *Pollards*, if the *Water* get in on the *Top*, and they become Hollow, they put forth the more. We adde also, that it is deliuered for certaine by some, that if the *Cions* be grafted, the Small End downwards, it will make *Fruit* haue little or no *Coares*, and *Stones*.

T obacco is a thing of great Price, if it be in request. For an *Acre* of it will be worth, (as is affirmed,) two Hundred Pounds, by the yeare, towards Charge. The Charge of making the Ground, and otherwise, is great, but nothing to the Profit. But the *English Tobacco*, hath small credit, as being too *Dull*, and *Earthy*: Nay the *Virginian Tobacco*, though that be in a *Hotter Climate*, can get no credit, for the same Cause: So that
a Triall

Experiment
Solitary, touching the
Comparatiue Magni-
tude of Liuing
Creatures.

853

Experiment
Solitary, touching
Exossati-
on of Fruits.

854

Experiment
Solitary touching the
Melioration of To-
bacco.

855

a Triall to make *Tobacco* more *Aromaticall*, and better Concocted here in *England*, were a Thing of great profit. Some haue gone about to doe it by Drenching the *English Tobacco*, in a *Decoction* or *Infusion* of *Indian Tobacco*: But those are but Sophistifications, and Toyes; For Nothing that is once Perfect, and hath run his Race, can receiue much Amendment. You must euer resort to the Beginnings of Things for *Melioration*. The Way of *Maturation* of *Tobacco* must, as in other *Plants*, be, from the *Heat*, Either of the *Earth*, or of the *Sunne*: We see some Leading of this in Musk-Melons; which are sown vpon a *Hot Bed*, Dunged below, vpon a Bancke turned vpon the *South Sunne*, to giue *Heat* by *Reflexion*; Laid vpon *Tiles*, which increaseth the *Heat*; And Couered with *Straw* to keepe them from *Cold*. They remoue them also, which addeth some *Life*: And by these Helpes they become as good in *England*, as in *Italy*, or *Prouence*. These, and the like Meanes, may be tried in *Tobacco*. Enquire also of the *Steeping* of the *Roots*, in some such *Liquor*, as may giue them *Vigour* to put forth *Strong*.

Experiment
Solitary touching
seuerall
Heats, working
the same Effects.

856

Heat of the *Sun*, for the *Maturation* of *Fruits*; Yea and the *Heat* of *Vinification* of *Living Creatures*; are both represented and supplied, by the *Heat* of *Fire*; And likewise, the *Heats* of the *Sunne*, and *Life*, are represented one by the other. *Trees*, set vpon the *Backes* of *Chimneyes*, doe ripen *Fruit* sooner. *Vines*, that haue beene drawne in at the *Window* of a *Kitchen*, haue sent forth *Grapes* ripe a *Month* (at least) before others. *Stones*, at the *Backe* of *Walls*, bring forth *Orenge*s here with vs. *Egges*, as is reported by some, haue beene hatched in the warmth of an *Ouen*. It is reported by the *Ancients*, that the *Estrich* Layeth her *Egs* vnder *Sand*, where the *Heat* of the *Sunne* discloseth them.

Experiment
Solitary touching
Swelling
and Dilatation
in *Boyling*.

857

Barley in the *Boyling* swelleth not much; *Wheat* swelleth more; *Rize* extremely; In so much as a *Quarter* of a *Pint* (vnboyled) will arise to a *Pint* boyled. The *Cause* (no doubt) is, for that the more *Clofe* and *Compact* the *Body* is, the more it will dilate: Now *Barley* is the most *Hollow*; *Wheat* more *Solide* than that; and *Rize* most *Solide* of all. It may be also that some *Bodies* haue a *Kinde* of *Lentour*, and more *Deper-tible Nature* than others; As we see it euident in *Colouration*; For a *Small Quantitie* of *Saffron*, will *Tinct* more, than a very great *Quantitie* of *Bressill*, or *Wine*.

Experiment
Solitary touching
the *Dul-coration* of
*Fruit*s.

858

Fruit groweth *Sweet* by *Rowling*, or *Pressing* them gently with the *Hand*; As *Rowling-Peares*, *Damasins*, &c. By *Rottènnesse*; As *Medlars*, *Seruices*, *Sloe's*, *Heps*, &c. By *Time*; As *Apples*, *Wardens*, *Pomgranats*, &c. By certaine *Speciall Maturations*; As by *Laying* them in *Hay*, *Straw*, &c. And by *Fire*; As in *Roasting*, *Stewing*, *Baking*, &c. The *Cause* of the *Sweetnesse* by *Rowling*, and *Pressing*, is *Emollition*, which they properly enduce; As in *Beating* of *Stock-Fish*, *Flesh*, &c. By *Rottènnesse* is, for that the *Spirits* of the *Fruit*, by *Putrefaction*, gather *Heat*, and thereby digest the

the Harder Part: For in all *Putrefactions*, there is a *Degree* of *Heat*. By *Time* and *Keeping* is, because the *Spirits* of the *Body*, doe euer feed vpon the *Tangible Parts*, and attenuate them. By *Seuerall Masurations* is, by some *Degree* of *Heat*. And by *Fire* is, because it is the Proper Worke of *Heat* to Refine, and to Incorporate; And all *Sourenesse* consisteth in some *Grossenesse* of the *Body*: And all *Incorporation* doth make the *Mixture* of the *Body*, more *Equall*, in all the *Parts*; Which euer induceth a *Milder Taste*.

OF *Fleashes*, some are *Edible*; Some, except it be in *Famine*, not. For those that are not *Edible*, the *Cause* is, for that they haue (commonly) too much *Bitternesse* of *Taste*; And therefore those *Creatures*, which are Fierce and *Cholericke*, are not *Edible*; As *Lions*, *Wolues*, *Squirrells*, *Dogs*, *Foxes*, *Horses*, &c. As for *Kine*, *Sheepe*, *Goats*, *Deere*, *Swine*, *Conneyes*, *Hares*, &c. We see they are *Milde*, and *Fearfull*. Yet it is true, that *Horses*, which are *Beasts* of *Courage*, haue beene, and are eaten by some *Nations*; As the *Scythians* were called *Hippophagi*; And the *Chineses* eat *Horse-flesh* at this day; And some *Gluttons* haue vsed to haue *Colts-flesh* baked. In *Birds*, such as are *Carniuora*, and *Birds of Prey*, are commonly no *Good Meat*; But the Reason is, rather the *Cholericke Nature* of those *Birds*, than their *Feeding* vpon *Flesh*; For *Puits*, *Gulls*, *Shoublers*, *Duckes*, doe feed vpon *Flesh*, and yet are *Good Meat*: And we see, that those *Birds*, which are of *Prey*, or feed vpon *Flesh*, are *good Meat*, when they are very *Young*; As *Hawkes*, *Rookes* out of the *Nest*, *Owles*, &c. *Mans Flesh* is not Eaten. The Reasons are Three: First, because *Men* in *Humanity* doe abhorre it: Secondly, because no *Liuing Creature*, that *Dyeth* of *it selfe*, is good to Eat: And therefore the *Caniballs* (themselues) eat no *Mans-flesh*, of those that *Dye* of *Themselues*, but of such as are *Slaine*. The Third is, because there must be (generally) some *Disparity*, betweene the *Nourishment*, and the *Body Nourished*; And they must not be *Ouer-neere*, or like: Yet we see, that in great *Weakneses*, and *Consumptions*, *Men* haue beene sustained with *Womans Milke*: And *Ficinus* fondly (as I conceiue) aduise, for the *Prolongation* of *Life*, that a *Veine* be opened in the *Arme* of some wholesome *Young Man*; And the *Bloud* to be sucked. It is said, that *Witches* doe greedily eat *Mans-flesh*; which if it be true, besides a *Diuellish Appetite* in them, it is likely to proceed, for that *Mans-flesh* may send vp *High* and *Pleasant Vapours*, which may stirre the *Imagination*; And *Witches Felicitie* is chiefly in *Imagination*, as hath beene said.

There is an Ancient Received *Tradition* of the *Salamander*, that it liueth in the *Fire*, and hath force also to extinguish the *Fire*. It must haue two Things, if it be true, to this *Operation*: The One a very *Close Skin*, whereby *Flame*, which in the *Midst* is not so hot, cannot enter: For we see that if the *Palme* of the *Hand* be annointed thicke with *White of Egge*, and then *Aquasuisa* be powred vpon it, and Enflamed, yet one may endure the *Flame* a pretty while. The other is some *Extreme Cold* and

Quenching

Experiment
Solitary, touching
Flesh E-
dible, and not
Edible.

859

Experiment
Solitary, touching
the Sala-
mander.

860

Quenching vertue, in the *Body* of that *Creature*, which choaketh the *Fire*. We see that *Milke* quencheth *Wild-Fire*, better than *Water*, because it entreth better.

Experiment
Solitary tou-
ching the Con-
trary Operations
of Time, vpon
Fruits, and Li-
quors.

861

Time doth change *Fruit*, (as *Apples*, *Pearres*, *Pomgranats*, &c.) from more *Sowre*, to more *Sweet*: But contrariwise *Liquors* (euen those that are of the *Iuyce* of *Fruit*) from more *Sweet* to more *Sowre*; As *Wort*, *Must*, *New Veriuyce*, &c. The *Cause* is, the *Congregation* of the *Spirits* together: For in both *Kindes*, the *Spirit* is attenuated by *Time*; But in the first *Kind*, it is more *Diffused*, and more *Mastered* by the *Groffer Parts*, which the *Spirits* doe but digest: But in *Drinckes* the *Spirits* doe raigne, and finding lesse *Opposition* of the *Parts*, become themselues more *Strong*; Which causeth also more *Strength* in the *Liquor*; Such, as if the *Spirits* be of the *Hotter Sort*, the *Liquor* becommeth apt to *Burne*; But in *Time*, it causeth likewise, when the *Higher Spirits* are *Euaporated*, more *Sowrenesse*.

Experiment
Solitary tou-
ching *Blowes*
and *Bruises*.

862

It hath beene obserued by the *Ancients*, that *Plates* of *Metall*, and especially of *Brasse*, applied presently to a *Blow*, will keepe it downe from *Swelling*. The *Cause* is *Repercussion*, without *Humectation*, or *Entrance* of any *Body*: for the *Plate* hath only a *Virtuall Cold*, which doth not search into the *Hurt*; Whereas all *Plasters*, and *Ointments* do enter. Surely, the *Cause*, that *Blowes* and *Bruises* enduce *Swellings*, is, for that the *Spirits* resorting to *Succour* the *Part* that *Laboureth*, draw also the *Humours* with them: For we see, that it is not the *Repulse*, and the *Returne* of the *Humour* in the *Part Strucken*, that causeth it; For that *Gouts*, and *Tooth-Aches* cause *Swelling*, where there is no *Percussion* at all.

Experiment
Solitary, tou-
ching the *Orris*
Root.

863

The *Nature* of the *Orris Root*, is almost *Singular*; For there bee few *Odoriferous Roots*; And in those that are, in any degree, *Sweet*, it is but the same *Sweetnesse* with the *Wood*, or *Leafe*: But the *Orris* is not *Sweet* in the *Leafe*; Neither is the *Flower* any thing so *Sweet* as the *Root*. The *Root* seemeth to haue a *Tender dainty Heat*; Which when it cometh aboue *Ground*, to the *Sunne*, and the *Aire*, vanisheth: For it is a great *Mollifier*; And hath a *Smell* like a *Violes*.

Experiment
Solitary tou-
ching the Com-
pression of Li-
quors.

864

It hath beene obserued by the *Ancients*, that a great *Vessell* full, drawne into *Bottles*; And then the *Liquor* put againe into the *Vessell*; will not fill the *Vessell* againe, so full as it was, but that it may take in more *Liquor*: And that this holdeth more in *Wine*, than in *Water*. The *Cause* may be *Triuiall*; Namely, by the *Expence* of the *Liquor*, in regard some may sticke to the *Sides* of the *Bottles*: But there may be a *Cause* more *Subtill*; Which is, that the *Liquor* in the *Vessell*, is not so much *Compressed*, as in the *Bottle*; Because in the *Vessell*, the *Liquor* meeteth with *Liquor* chiefly; But in the *Bottles* a *Small Quantity* of *Liquor*, mee-
teth

teth with the Sides of the *Bottles*, which Compresse it so, that it doth not Open againe.

Water, being contiguous with *Aire*, Cooleth it, but Moisteneth it not, except it *Vapour*. The Cause is, for that *Heat*, and *Cold* have a *Virtuall Transition*, without *Communication* of *Substance*; but *Moisture* not: And to all *Madefaction* there is required an *Imbibition*: But where the *Bodies* are of such severall *Leuity*, and *Gtauity*, as they Mingle not, there can follow no *Imbibition*. And therefore, *Oile* likewise lyeth at the *Top* of the *Water*, without *Commixture*: And a *Drop* of *Water*, running swiftly ouer a *Straw*, or *Smooth Body*, wetteth not.

Experiment
Solitary tou-
ching the Wor-
king of *Water*
vpon *Aire* Con-
tiguous.

865

Star-light *Nights*, yea and bright *Moone-shine Nights*, are *Colder* than *Cloudy Nights*. The Cause is, the *Driness* and *Finewesse* of the *Aire*, which thereby becommeth more *Piercing*, and *Sharpe*: And therefore *Great Continents* are colder than *Islands*: And as for the *Moone*, though it selfe inclineth the *Aire* to *Moisture*, yet when it shineth bright, it argueth the *Aire* is dry. Also *Close Aire* is warmer than *Open Aire*; which (it may be) is, for that the true Cause of *Cold*, is an *Expiration* from the *Globe* of the *Earth*, which in open *Places* is stronger; And againe, *Aire* it selfe, if it be not altered by that *Expiration*, is not without some *Secret Degree* of *Heat*: As it is not likewise without some *Secret Degree* of *Light*: For otherwise *Cats*, and *Owles*, could not see in the *Night*; But that *Aire* hath a little *Light*, Proportionable to the *Visuall Spirits* of those *Creatures*.

Experiment
Solitary tou-
ching the Na-
ture of *Aire*.

866

The *Eyes* doe moue one and the same way; For when one *Eye* moueth to the *Nostrill*, the other moueth from the *Nostrill*. The Cause is *Motion* of *Consent*, which in the *Spirits*, and *Parts Spirituall*, is Strong. But yet *Use* will induce the Contrary: For some can *Squint*, when they will: And the Common *Tradition* is, that if *Children* be set vpon a *Table*, with a *Candle* behind them, both *Eyes* will moue *Outwards*; As affecting to see the *Light*, and so induce *Squinting*.

Experiments
in Confort
touching the
Eyes, and *Sight*.

867

Wee see more exquisitely with *One Eye Shut*, than with *Both Open*. The Cause is, for that the *Spirits Visuall* vnite themselues more, and so become Stronger. For you may see, by looking in a *Glasse*, that when you shut one *Eye*, the *Pupill* of the other *Eye*, that is *Open*, Dilateth.

868

The *Eyes*, if the *Sight* meet not in one *Angle*, See *Things Double*. The Cause is, for that *Seeing* two *Things*, and *Seeing* one *Thing* twice, worketh the same *Effect*: And therefore a little *Pellet*, held betweene two *Fingers*, laid a-crosse, seemeth *Double*.

869

Pore-blinde Men, see best in the *Dimmer Lights*; And likewise haue their *Sight* Stronger neere hand, than those that are not *Pore-blind*; And can *Reade* and *Write* smaller *Letters*. The Cause is, for that the *Spirits Visuall*, in those that are *Pore-blinde*, are *Thinner*, and *Rarer*, than in others; And therefore the *Greater Light* disperseth them. For the same

870

Cause they need Contracting; But being Contracted, are more strong, than the *Visuall Spirits* of Ordinary *Eyes* are; As when we see thorow a *Lenell*, the *Sight* is the Stronger: And so is it, when you gather the *Eye-lids* somewhat close: And it is commonly seene in those that are *Pore-blinde*, that they doe much gather the *Eye-lids* together. But *Old Men*, when they would see to Reade, put the Paper somewhat as farre off. The Cause is, for that *Old Mens Spirits Visuall*, contrary to those of *Pore-blinde Men*, vnite not, but when the *Object* is at some good distance, from their *Eyes*.

871

Men see better, when their *Eyes* are ouer-against the *Sunne*, or a *Candle*, if they put their *Hand* a little before their *Eye*. The Reason is, for that the *Glaring* of the *Sunne*, or the *Candle*, doth weaken the *Eye*; whereas the *Light Circumfused* is enough for the *Perception*. For we see, that an *Over-light* maketh the *Eyes* Dazell; Insomuch as Perpetuall Looking against the *Sunne*, would Cause *Blindnesse*. Again, if *Men* come out of a *Great Light*, into a *Darke Roome*; And contrariwise, if they come out of a *Darke Roome*, into a *Light Roome*, they seeme to haue a *Mist* before their *Eyes*, and see worse, than they shall doe, after they haue stayed a little while, either in the *Light*, or in the *Darke*. The Cause is, for that the *Spirits Visuall*, are vpon a Sudden Change, disturbed, and put out of Order; And till they be recollected, doe not performe their Function well. For when they are much Dilated by *Light*, they cannot Contract suddenly; And when they are much Contracted by *Darknesse*, they cannot Dilate suddenly. And Excesse of both these (that is, of the *Dilatation*, and *Contraction* of the *Spirits Visuall*,) if it belong, Destroyeth the *Eye*. For as long Looking against the *Sun*, or *Fire*, hurteth the *Eye* by *Dilatation*; So *Curious Painting* in *Small Volumes*, and *Reading* of *Small Letters*, doe hurt the *Eye* by *Contraction*.

872

It hath beene obserued, that in *Anger*, the *Eyes* wax *Red*; And in *Blushing*, not the *Eyes*, but the *Eares*, and the *Parts* behinde them. The Cause is, for that in *Anger*, the *Spirits* ascend and wax Eager; Which is most easily seene in the *Eyes*, because they are Translucide; Though withall it maketh both the *Cheekes*, and the *Gills* *Red*; But in *Blushing*, it is true, the *Spirits* ascend likewise to Succour, both the *Eyes*, and the *Face*, which are the *Parts* that labour: But then they are repulsed by the *Eyes*, for that the *Eyes*, in Shame doe put backe the *Spirits*, that ascend to them, as vnwilling to looke abroad: For no *Man*, in that *Passion*, doth looke strongly, but Deiectedly; And that *Repulsion* from the *Eyes*, Diuerteth the *Spirits* and *Heat* more to the *Eares*, and the *Parts* by them.

873

The *Objects* of the *Sight*, may cause a great *Pleasure* and *Delight* in the *Spirits*, but no *Paine*, or great *Offence*; Except it be by *Memory*, as hath beene said. The *Glimses* and *Beames* of *Diamonds* that strike the *Eye*; *Indian Feathers*, that haue glorious Colours; The *Comming* into a *Faire Garden*; The *Comming* into a *Faire Roome* richly furnished; A *Beautiful Person*; And the like; doe delight and exhilarate the *Spirits* much. The Reason,

Reason, why it holdeth not in the *Offence*, is, for that the *Sight* is the most *Spiritual* of the *Senses*; whereby it hath no *Object* *Grosse* enough to offend it. But the *Cause* (chiefly) is, for that there be no *Active Objects* to offend the *Eye*. For *Harmonicall Sounds*, and *Discordant Sounds*, are both *Active*, and *Passive*: So are *Sweet Smells*, and *Stinkes*: So are *Bitter*, and *Sweet*, in *Tastes*: So are *Over-Hot*, and *Over-Cold*, in *Touch*: But *Blacknesse*, and *Darknesse*, are indeed but *Privatives*; And therefore haue little or no *Activitie*. Somewhat they doe *Contristate*, but very little.

Water of the *Sea*, or otherwise, looketh *Black*er when it is moued, and *Whiter* when it resteth. The *Cause* is, for that by meanes of the *Motion*, the *Beames* of light passe not *Straight*, and therefore must be darkened: whereas, when it resteth, the *Beames* doe passe *Straight*. Besides, *Splendour* hath a *Degree* of *Whitenesse*; Especially if there be a little *Repercussion*: For a *Looking-Glasse* with the *Steele* behinde, looketh *Whiter*, than *Glasse Simple*. This *Experiment* deserueth to be driuen further, in *Trying* by what *Meanes Motion* may hinder *Sight*.

Shell-Fish haue beene, by some of the *Ancients*, compared and sorted with the *Insecta*; But I see no reason why they should; For they haue *Male*, and *Female*, as other *Fish* haue: Neither are they bred of *Putrefaction*; Especially such as doe Moue. Neuerthelesse it is certaine, that *Oysters*, and *Cockles*, and *Muscles*, which Moue not, haue no discriminate *Sex*: *Quare* in what time, and how they are bred? It seemeth that *Shells* of *Oysters* are bred where none were before; And it is tried, that the great *Horse-Muscle*, with the fine shell, that breedeth in *Ponds*, hath bred within thirty yeares: But then, which is strange, it hath beene tried, that they doe not only *Gape*, and *Shut*, as the *Oysters* doe, but *Remoue* from one *Place* to *Another*.

The *Senses* are alike *Strong*, both on the *Right Side*, and on the *Left*; But the *Limbes* on the *Right Side* are *Stronger*. The *Cause* may be, for that the *Braine*, which is the *Instrument* of *Sense*, is alike on both *Sides*; But *Motion*, and *Habillities* of *Mouing*, are somewhat holpen from the *Liver*, which lieth on the *Right Side*. It may be also, for that the *Senses* are put in *Exercise*, indifferently, on both *Sides*, from the *Time* of our *Birth*; But the *Limbes* are vsed most on the *Right Side*, whereby *Custom* helpeth; For we see that some are *Left-Handed*: Which are such, as haue vsed the *Left Hand* most.

Frictions make the *Parts* more *Fleshie*, and *Full*: As wee see both in *Men*; And in *Currying* of *Horses*, &c. The *Cause* is, for that they draw greater *Quantitie* of *Spirits* and *Bloud* to the *Parts*: And againe, because they draw the *Aliment* more forcibly from within: And againe, because they relax the *Pores*, and so make better *Passage* for the *Spirits*, *Bloud*, and *Aliment*: Lastly, because they dissipate and digest any *Inutile* or *Excrementitious*

Experiment
Solitary touching the Colour of the Sea, or other Water.

874

Experiment
Solitary touching Shell-Fish.

875

Experiment
Solitary touching the Right Side, and the Left.

876

Experiment
Solitary touching Friction.

877

crementitious Moisture, which lieth in the *Flesh*: All which helpe *Assimilation*. *Frictions* also doe more *Fill*, and *Impinguate* the *Body*, than *Exercise*. The *Cause* is, for that in *Frictions*, the *Inward Parts* are at rest; Which in *Exercise* are beaten (many times) too much: And for the same Reason, (as we haue noted heretofore) *Gally-Slaues* are *Fat* and *Fleshy*, because they stirre the *Limmes* more, and the *Inward Parts* lesse.

Experiment
Solitary tou-
ching Globes
appearing Flat
at Distance.

878

ALL Globes as farre off appeare Flat. The *Cause* is, for that *Distance* being a *Secondary Object of Sight*, is not otherwise discerned, than by more or lesse *Light*; which *Disparity* when it cannot be discerned, all seemeth *One*: As it is (generally) in *Objects* not distinctly discerned; For so *Letters*, if they be so farre off, as they cannot be discerned, shew but as a *Dusky Paper*: And all *Engravings* and *Embossings*, (as farre off) appeare *Plaine*.

Experiment
Solitary tou-
ching Shadowes

879

THE *Vtmost Parts* of *Shadowes* seeme euer to *Tremble*. The *Cause* is, for that the little *Moats*, which we see in the *Sunne*, doe euer *Stirre*, though there be no *Wind*; And therefore those *Mouing*, in the Meeting of the *Light* and the *Shadow*, from the *Light* to the *Shadow*, and from the *Shadow* to the *Light*, doe shew the *Shadow* to *Moue*, because the *Medium* *Moueth*.

Experiment
Solitary tou-
ching the Row-
ling and Brea-
king of the Seas.

880

SHallow, and *Narrow Seas*, breake more than *Deepe*, and *Large*. The *Cause* is, for that the *Impulsion* being the same in Both; Where there is greater *Quantity* of *Water*, and likewise *Space* Enough; there the *Water* *Rowleth* and *Moueth*, both more *Slowly*, and with a *Sloper Rise*, and *Fall*: But where there is lesse *Water*, and lesse *Space*, and the *Water* dasheth more against the *Bottom*; there it *moueth* more *Swiftly*, and more in *Precipice*; For in the *breaking* of the *Wanes* there is euer a *Precipice*.

Experiment
Solitary tou-
ching the Dis-
coloration of Salt-
Water.

881

IT hath beene obserued by the *Ancients*, that *Salt Water* *Boyled*, or *Boyled* and *Cooled* againe, is more *Potable*, than of it selfe *Raw*: And yet the *Taste* of *Salt*, in *Distillations* by *Fire*, riseth not; For the *Distilled Water* will be *Fresh*. The *Cause* may be, for that the *Salt Part* of the *Water*, doth partly rise into a Kind of *Scumme* on the *Top*; And partly goeth into a *Sediment* in the *Bottom*: And so is rather a *Separation*, than an *Evaporation*. But it is too grosse to rise into a *Vapour*: And so is a *Bitter Taste* likewise; For Simple *Distilled Waters*, of *Wormewood*, and the like, are not *Bitter*.

Experiment
Solitary tou-
ching the Re-
turne of Salt-
nesse in Pits vp-
on the Sea-
Shore.

882

IT hath beene set downe before, that *Pits* vpon the *Sea-Shore*, turne into *Fresh Water*, by *Percolation* of the *Salt* through the *Sand*: But is further noted, by some of the *Ancients*, that in some Places of *Affricke*, after a time, the *Water* in such *Pits* will become *Brackish* againe. The *Cause* is, for that after a time, the very *Sands*, thorow which the *Salt-Water* passeth, become *Salt*; And so the *Strainer* it selfe is tinged with *Salt*.

Salt. The Remedy therefore is, to digge still *New Pits*, when the old wax *Brackish*; As if you would change your *Strainer*,

IT hath beene obserued by the *Ancients*, that *Salt-Water*, will dissolve *Salt* put into it, in lesse time, than *Fresh Water* will dissolve it. The Cause may be, for that the *Salt* in the *Precedent Water*, doth, by *Similitude* of *Substance*, draw the *Salt* new put in, vnto it; Whereby it diffuseth in the *Liquor* more speedily. This is a *Noble Experiment*, if it be true; For it sheweth *Meanes* of more *Quicke* and *Easie Infusions*; And it is likewise a good *Instance* of *Attraction*, by *Similitude* of *Substance*. Try it with *Sugar* put into *Water*, formerly *Sugred*; And into other *Water* *Unsugred*.

Put *Sugar* into *Wine*, part of it above, part vnder the *Wine*; And you shall finde, (that which may seeme strange,) that the *Sugar* above the *Wine*, will soften and dissolve sooner, than that within the *Wine*. The Cause is, for that the *Wine* entreth that *Part* of the *Sugar*, which is vnder the *Wine*, by *Simple Infusion*, or *Spreading*; But that *Part* above the *Wine* is likewise forced by *Sucking*: For all *Spungie Bodies* expell the *Aire*, and draw in *Liquor*, if it be *Coniguons*: As we see it also in *Spunges*, put part about the *Water*. It is worthy the *Inquiry*, to see how you may make more *Accurate Infusions*, by *Helpe* of *Attraction*.

Water in *Wells* is warmer in *Winter*, than in *Summer*: And so *Aire* in *Caves*. The Cause is, for that in the *Hither Parts*, vnder the *Earth*, there is a *Degree* of some *Heat*; (As appeareth in *Sulphureous Veines*, &c.) Which shut close in, (as in *Winter*) is the *Mote*; But if it *Perpire*, (as it doth in *Summer*), it is the *Lesse*.

IT is reported, that amongst the *Leucaciens*, in *Ancient* time, vpon a *Superstition*, they did vse to *Precipitate* a *Man*, from a *High Cliffe* into the *Sea*; Tying about him, with *Strings*, at some distance, many great *Fowles*; And fixing vnto his *Body* diuers *Feathers*, spred, to breake the *Fall*. Certainly many *Birds* of good *Wing*, (As *Kites*, and the like) would beare vp a good *Weight* as they flie; And *Spreading* of *Feathers*, thin and close, and in great *Bredth*, will likewise beare vp a great *Weight*; Being euen laid, without *Tilting* vpon the *Sides*. The further *Extension* of this *Experiment* for *Flying* may be thought vpon.

There is, in some *Places*, (namely in *Cephalonia*), a little *Shrub*, which they call *Holy-Oake*, or *Dmarfe-Oake*: Vpon the *Leaves* whereof there riseth a *Tumour*, like a *Blister*; Which they gather, and rub out of it, a certaine *Red Dust*, that conuerteth (after a while) into *Wormes*, which they kill with *Wine*, (as is reported,) when they beginne to *Quicken*: With this *Dust* they die *Scarlet*.

IN *Zant*, it is very ordinary, to make *Men Impotent*, to accompany with

Experiment
Solitary touching
Attraction by Similitude
of Substance.

883

Experiment
Solitary touching
Attraction.

884

Experiment
Solitary touching
Heat vnder
Earth.

885

Experiment
Solitary touching
Flying in
the Aire.

886

Experiment
Solitary touching
the Dye
of Scarlet.

887

Experiment
Solitary tou-

ching Malici-
ciating.

888

Experiment
Solitary tou-
ching the Rise
of Water, by
Meanes of
Flame.

889

Experiments
in Consort,
touching the
Influences of
the Moone.

with their *Wines*. The like is Practised in *Gasconie*; Where it is called *Nouër l'eguillette*. It is practised alwaies vpon the *Wedding Day*. And in *Zant*, the Mothers themselves doe it, by way of Preuention; Because thereby they hinder other *Charmes*, and can vndoe their Owne. It is a Thing the *Ciuill Law* taketh knowledge of; And therefore is of no Light Regard.

IT is a Common *Experiment*, but the Cause is mistaken. Take a *Pot*, (Or better a *Glasse*, because therein you may see the *Motion*.) And set a *Candle* lighted in the *Bottom* of a *Basen* of *Water*; And turne the *Mouth* of the *Pot*, or *Glasse*, ouer the *Candle*, and it will make the *Water* rise. They ascribe it, to the *Drawing* of *Heat*; Which is not true: For it appeareth plainly to be but a *Motion* of *Nexe*, which they call *Ne desuyr vacuum*; And it proceedeth thus. The *Flame* of the *Candle*, as soone as it is covered, being suffocated by the *Close Aire*, lesseneth by little and little: During which time, there is some little *Ascent* of *Water*, but not much: For the *Flame* Occupying lesse and lesse *Roome*, as it lesseneth, the *Water* succeedeth. But vpon the *Instant* of the *Candles Going out*, there is a sudden *Rise*, of a great deale of *Water*; For that the *Body* of the *Flame* filleth no more *Place*; And so the *Aire*, and the *Water* succeed. It worketh the same *Effect*, if in stead of *Water*, you put *Flower*, or *Sand*, into the *Basen*: Which sheweth, that it is not the *Flames* drawing the *Liquour*, as *Non-rishment*; As it is supposed; For all *Bodies* are alike vnto it; As it is euer in *Motion* of *Nexe*; In somuch as I haue scene the *Glasse*, being held by the *Hand*, hath lifted vp the *Basen*, and all: The *Motion* of *Nexe*, did so Clasp the *Bottom* of the *Basen*. That *Experiment*, when the *Basen* was lifted vp, was made with *Oile*, and not with *Water*: Neuertheless this is true, that at the very first *Setting* of the *Mouth* of the *Glasse*, vpon the *Bottom* of the *Basen*, it draweth vp the *Water* a little, and then standeth at a *Stay*, almost till the *Candles Going out*, as was said. This may shew some *Attraction* at first: But of this we will speake more, when we handle *Attractions* by *Heat*.

Of the *Power* of the *Celestiall Bodies*, and what more *Secret Influences* they haue, besides the two Manifest *Influences* of *Heat*, and *Light*, We shall speake, when we handle *Experiments* touching the *Celestiall Bodies*: Meane-while, wee will giue some *Directions* for more certaine *Trials*, of the *Virtue* and *Influences* of the *Moone*; which is our *Neereft Neighbour*.

The *Influences* of the *Moone*, (most obserued,) are *Four*. The *Drawing forth* of *Heat*: The *Inducing* of *Putrefaction*: The *Increase* of *Moisture*: The *Exciting* of the *Motions* of *Spirits*.

For

For the *Drawing forth* of *Heat*, we haue formerly prescribed, to take *Water Warne*, and to set Part of it against the *Moone-Beames*, and Part of it with a *Skreene* betweene; And to see whether that which standeth Exposed to the *Beames*, will not *Cool* sooner. But because this is but a *Small Interposition*, (though in the *Sun* we see a *Small Shade* doth much,) it were good to trie it, when the *Moone* shineth, and when the *Moone* shineth not at all; And with *Water Warne* in a *Glasse-Bottle*, as well as in a *Dish*; And with *Cinders*; And with *Iron Red-Hot*; &c.

890

For the *Inducing* of *Putrefaction*, it were good to trie it with *Flesh*, or *Fish*, Exposed to the *Moone-Beames*; And againe Exposed to the *Aire*, when the *Moone* shineth not, for the like time; To see whether will corrupt sooner: And trie it also with *Capon*, or some other *Fowle*, laid abroad, to see whether it will mortifie, and become tender sooner? Trie it also with *Dead Flies*, or *Dead Wormes*, hauing a little *Water* cast vpon them, to see whether will *Putrifie* sooner. Trie it also with an *Apple*, or *Orange*, hauing *Holes* made in their *Tops*, to see whether will Rot or Mould sooner? Try it also with *Holland-Cheese*, hauing *Wine* put into it, whether will breed *Mites* sooner, or greater?

891

For the *Increase* of *Moisture*, the Opinion Receiued is; That *Seeds* will grow soonest; And *Haire*, and *Nails*, and *Hedges*, and *Herbs*, Cut, &c. will grow soonest, if they be Set, or Cut, in the *Increase* of the *Moone*. Also that *Braines* in *Rabbits*, *Wood-cockes*, *Calues*, &c. are fullest in the *Full* of the *Moone*. And so of *Marrow* in the *Bones*: And so of *Oysters*, and *Cockles*, which of all the rest are the easiest tried, if you haue them in *Pies*.

892

Take some *Seeds*, or *Roots*, (as *Onions*, &c.) and set some of them immediately after the *Change*; And others of the same kinde immediately after the *Full*. Let them be as Like as can be: The *Earth* also the Same as neare as may be; And therefore best in *Pots*: Let the *Pots* also stand, where no *Raine*, or *Sunne* may come to them, lest the *Difference* of the *Weather* confound the *Experiment*: And then see in what Time, the *Seeds* Set in the *Increase* of the *Moone*, come to a certaine Height; And how they differ from those that are Set in the *Decrease* of the *Moone*.

893

It is like, that the *Braine* of *Man* waxeth *Moister*, and *Fuller*, vpon the *Full* of the *Moone*: And therefore it were good for those that haue *Moist* *Braines*, and are great *Drinkers*, to take *Fume* of *Lignum Aloës*, *Rose-Mary*, *Frankincense*, &c. about the full of the *Moone*. It is like also, that the *Humours* in *Mens Bodies*, Increase, and Decrease, as the *Moone* doth; And therefore it were good to Purge, some day, or two, after the *Full*; For that then the *Humours* will not replenish so soone againe.

894

As for the *Exciting* of the *Motion* of the *Spirits*, you must note that the *Growth* of *Hedges*, *Herbs*, *Haire*, &c. is caused from the *Moone*, by *Exciting* of the *Spirits*, as well as by *Increase* of the *Moisture*. But for *Spirits* in particular, the great *Instance* is in *Lunacies*.

895

There may be other *Secret Effects* of the *Influence* of the *Moone*, which are not yet brought into *Observation*. It may be, that if it so fall out,

896

898

897

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Experiment
Solitary tou-
ching Vinegar.

898

898

Experiment
Solitary tou-
ching Creatures
that sleepe all
winter.

899

898

Experiment
Solitary tou-
ching the Ge-
nerating of
Creatures by Co-
pulation, and by
Putrefaction.

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out, that the *Wind* be *North*, or *North-East*, in the *Full* of the *Moone*, it increaseth *Cold*; And if *South*, or *South West*, it disposeth the *Aire*, for a good while, to *Warmth*, and *Raine*; Which would be obserued.

It may be, that *Children*, and *Young Cattle*, that are Brought forth in the *Full* of the *Moone*, are stronger, and larger, than those that are brought forth in the *Wane*: And those also which are Begotten in the *Full* of the *Moone*: So that it might be good *Husbandry*, to put *Rams*, and *Bulls* to their *Female*, somewhat before the *Full* of the *Moone*. It may be also, that the *Egges* lay'd in the *Full* of the *Moone*, breed the better *Bird*: And a Number of the like *Effects*, which may be brought into *Observation*: *Quare* also, whether great *Thunders*, and *Earth-Quakes*, be not most in the *Full* of the *Moone*?

THe *Turning* of *Wine* to *Vinegar*, is a *Kinde* of *Putrefaction*: And in *Making* of *Vinegar*, they vse to set *Vessels* of *Wine* ouer against the *Noone-Sunne*; which calleth out the more *Oily Spirits*, and leaueth the *Liquour* more *Soure*, and *Hard*. We see also, that *Burnt-Wine* is more *Hard*, and *Astringent*, than *Wine Vnburnt*. It is said, that *Cider* in *Nauigations* vnder the *Line* ripeneth, when *Wine* or *Beere* soureth. It were good to set a *Rundlet* of *Verinyce* ouer against the *Sunne*, in *Summer*, as they doe *Vinegar*, to see whether it will *Ripen*, and *Sweeten*.

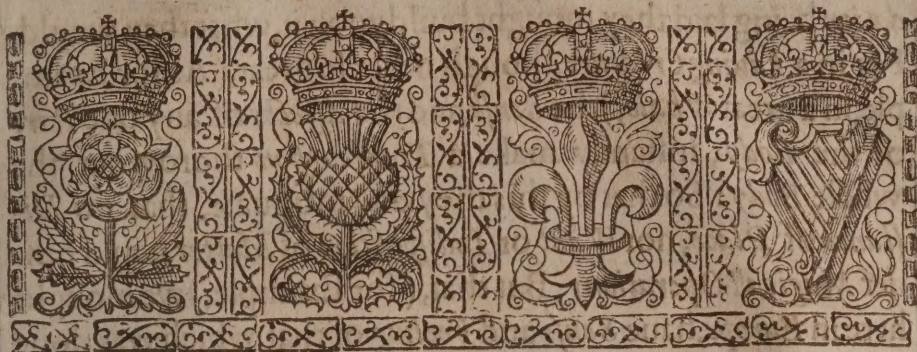
THere be diuers *Creatures*, that *Sleepe* all *Winter*; As the *Beare*, the *Hedge-hogge*, the *Bat*, the *Bee*, &c. These all wax *Fat* when they *Sleepe*, and egeft not. The *Cause* of their *Fattening*, during their *Sleeping time*, may be the *Want* of *Assimilating*; For whatsoeuer *Assimilateeth* not to *Flesh*, turneth either to *Sweat*, or *Fat*. These *Creatures*, for part of their *Sleeping Time*, haue beene obserued not to *Stirre* at all; And for the other part, to *Stirre*, but not to *Remoue*. And they get *Warme* and *Clofe Places* to *Sleepe* in. When the *Flemmings* Wintred in *Noua Zembla*, the *Beares*, about the *Middle* of *November*, went to *Sleepe*; And then the *Foxes* began to come forth, which durst not before. It is noted by some of the *Ancients*, that the *Shee-Bear* breedeth, and lyeth in with their *Young*, during that time of *Rest*: And that a *Beare*, *Bigge* with *Young*, hath seldome beene seene.

Some *Living Creatures* are Procreated by *Copulation* betweene *Male*, and *Female*: Some by *Putrefaction*; And of those which come by *Putrefaction*, many doe (neuerthelesse) afterwards procreate by *Copulation*. For the *Cause* of both *Generations*: First, it is most certaine, that the *Cause* of all *Vinification*, is a *Gentle* and *Proportionable Heat*, working vpon a *Glutinous* and *Yeelding Substance*: For the *Heat* doth bring forth *Spirit* in that *Substance*: And the *Substance*, being *Glutinous*, produceth Two *Effects*: The One, that the *Spirit* is *Detained*, and cannot *Breake forth*; The Other, that the *Matter* being *Gentle*, and *Yeelding*, is driven forwards by the *Motion* of the *Spirits*, after some *Swelling* into *Shape*, and *Members*.

There-

Therefore all *Sperme*, all *Menstruous Substance*, all *Matter* whereof *Creatures* are produced by *Putrefaction*, haue euermore a *Closenesse*, *Lentsour*, and *Sequasity*. It seemeth therefore, that the *Generation* by *Sperme* only, and by *Putrefaction*, haue two Different *Causes*. The First is, for that *Creatures*, which haue a *Definite* and *Exact Shape*, (as those haue which are Procreated by *Copulation*,) cannot be produced by a *Weake*, and *Casual Heat*; Nor out of *Matter*, which is not *exactly Prepared*, according to the *Species*. The Second is, for that there is a greater *Time* required for *Maturation* of *Perfect Creatures*; For if the *Time* required in *Viuisification* be of any length, then the *Spirits* will *Exhale*, before the *Creature* be *Mature*: Except it be *Enclosed* in a *Place* where it may haue *Continuance* of the *Heat*, *Accesse* of some *Nourishment* to maintaine it, and *Closenesse* that may keepe it from *Exhaling*. And such *Places* are the *Wombes*, and *Matrices*, of the *Females*. And therefore all *Creatures*, made of *Putrefaction*, are of more *Vncertaine Shape*; And are made in *Shorter Time*; And need not so *Perfect* an *Enclosure*, though some *Closenesse* be commonly required. As for the *Heathen Opinion*, which was, that vpon great *Mutations* of the *World*, *Perfect Creatures* were first Engendred of *Concretion*; As well as *Frogs*, and *Wormes*, and *Flies*, and such like, are now; Wee know it to be vaine: But if any such Thing should bee admitted, Discoursing according to *Sense*, it cannot be, except you admit a *Chaos* first, and *Commixture* of *Heauen*, and *Earth*. For the *Frame* of the *World*, once in *Order*, cannot effect it by any *Excesse*, or *Casualtie*.

NATV.



NATVRALL HISTORIE.

X. Century.



He Philosophie of Pythagoras, (which was full of Superstition,) did first plant a Monstrous Imagination; Which afterwards was, by the Schoole of Plato, and Others, Watred and Nourished. It was, that the World was One Entire, Perfect, Liuing Creature; In so much as Apollonius of Tyana, a Pythagorean Prophet, affirmed, that the Ebbing and Flowing of the Sea, was the Respiration of the World, drawing in Water as Breath, and putting it forth againe. They went on, and inferred; That if the World were a Liuing Creature, it had a Soule, and Spirit; Which also they held, calling it *Spiritus Mundi*; The Spirit or Soule of the World: By which they did not intend God; (for they did admit of a Deitie besides,) But only

Experiments
in Consort,
touching the
Transmission,
and Influx of
Immaterialle
Vertues, and the
Force of Imagi-
nation.

only the Soule, or *Essentiall Forme* of the *Vniuerse*. This *Foundation* being laid, they mought build vpon it, what they would; For in a *Liuing Creature*, though neuer so great, (As for Example, in a great *Whale*,) the *Sense*, and the *Affects* of any one *Part* of the *Body*, instantly make a *Transcursion* thorowout the whole *Body*: So that by this they did insinuate, that no *Distance* of *Place*, nor *Want* or *Indisposition* of *Matter*, could hinder *Magicall Operations*; But that, (for Example,) we mought here in *Europe*, haue *Sense* and *Feeling* of that, which was done in *China*: And likewise, we mought worke any *Effect*, without, and against *Matter*: And this, not Holpen by the *Cooperation* of *Angells*, or *Spirits*, but only by the *Vnity* and *Harmony* of *Nature*. There were some also, that staid not here; but went further, and held; That if the *Spirit* of *Man*, (whom they call the *Microcosme*,) doe giue a fit touch to the *Spirit* of the *World*, by strong *Imaginations*, and *Beleefes*, it might command *Nature*; For *Paracelsus*, and some darksome *Authors* of *Magicke*, doe ascribe to *Imagination Exalted*, the *Power* of *Miracle-working Faith*. With these *Vast* and *Bottomlesse Follies*, *Men* haue beene (in part) entertained.

But we, that hold firme to the *Workes* of *God*; And to the *Sense*, which is *Gods Lampe*; (*Lucerna Dei Spiraculum Hominis*;) will enquire with all *Sobrietie*, and *Seueritie*, whether there be to be found, in the *Foot-steps* of *Nature*, any such *Transmission* and *Influx* of *Immateriate Vertues*; And what the *Force* of *Imagination* is; Either vpon the *Body Imaginant*, or vpon another *Body*: Wherein it will be like that *Labour* of *Hercules*, in *Purging the Stable of Augeas*, to separate from *Superstitious*, and *Magicall Arts*, and *Observations*, any thing that is cleane, and pure *Naturall*; And not to be either *Contemned*, or *Condemned*. And although wee shall haue occasion to speake of this in more *Places* than *One*, yet wee will now make some *Entrance* thereinto.

Experiments
in Consort,
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mission of Spi-
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Force of Imagi-
nation.

MEN are to be Admonished, that they doe not withdraw Credit, from the *Operations* by *Transmission* of *Spirits*, and *Force* of *Imagination*, because the *Effects* faile sometimes. For as in *Infection*, and *Contagion* from *Body* to *Body*, (as the *Plague*, and the like,) it is most certaine, that the

the *Infection* is receiued (many times) by the *Body Passiue*, but yet is by the *Strength*, and good *Disposition* thereof, Repulsed, and wrought out, before it be formed into a *Disease*; So much more, in *Impressions* from *Minde* to *Minde*, or from *Spirit* to *Spirit*, the *Impression* taketh, but is Encountred, and Overcome, by the *Minde* and *Spirit*, which is *Passiue* before it worke any manifest *Effect*. And therefore, they worke most vpon *Weake Mindes*, and *Spirits*: As those of *Women*; *Sicke Persons*; *Superstitious*, and *Fearefull Persons*; *Children*, and *Young Creatures*.

Nescio quis teneros Oculis mihi fascinat Agnos:

The *Poet* speaketh not of *Sheepe*, but of *Lambs*. As for the *Weaknesse* of the *Power* of them, vpon *Kings*, and *Magistrates*; It may be ascribed (besides the maine, which is the *Protection* of *God*, ouer those that Execute his Place) to the *Weaknesse* of the *Imagination* of the *Imaginant*: For it is hard, for a *Witch*, or a *Sorcerer*, to put on a *Beleeffe*, that they can hurt such Persons.

Men are to be Admonished, on the other side, that they doe not easily giue Place and Credit to these *Operations*, because they *Succeed many times*; For the *Cause* of this *Succeffe*, is (oft) to be truly ascribed, vnto the *Force* of *Affection* and *Imagination*, vpon the *Body Agent*; And then by a *Secondary Meanes*, it may worke vpon a *Diuers Body*: As for Example; If a *Man* carry a *Planets Scale*, or a *Ring*, or some *Part* of a *Beast*, beleeuing strongly, that it will helpe him to obtaine his *Loue*; Or to keep him from danger of hurt in *Fight*; Or to preuaile in a *Suit*; &c. it may make him more *Active*, and *Industrious*; And againe, more *Confident*, and *Persisting*, than otherwise he would be. Now the great *Effects* that may come of *Industry*, and *Perseuerance*, (especially in *Ciuill Businesse*,) who knoweth not? For wee see *Audacitie* doth almost binde and mate the *weaker Sort* of *Minds*; And the *State* of *Humane Actions* is so variable, that to try Things oft, and neuer to giue ouer, doth Wonders: Therefore, it were a *Meere Fallacie* and *Mistaking*, to ascribe that to the *Force* of *Imagination*, vpon another *Body*, which is but the *Force* of *Imagination* vpon the *Proper Body*: For there is no doubt, but that *Imagination*, and *Vehement Affection*, worke greatly vpon the *Body* of the *Imaginant*: As we shall shew in due place.

Men are to be Admonished, that as they are not to mistake the *Causes* of these *Operations*; So, much lesse, they are to mistake the *Fact*, or *Effect*; And rashly to take that for done, which is not done. And therefore, as diuers wise *Iudges* haue prescribed, and cautioned, *Men* may not too rashly beleeue, the *Confessions* of *Witches*, nor yet the *Evidence* against them. For the *Witches* themselues are *Imaginative*, and beleeue oft-times, they doe that, which they doe not: And *People* are *Credulous* in that point, and ready to impute *Accidents*, and *Naturall Operations*, to *Witch-craft*. It is worthy the Obseruing, that both in *Ancient*, and *Late times*; (As in the *Thessalian Witches*, and the Meetings of *Witches* that haue beene recorded by so many late *Confessions*;) the great *Wonders* which they tell, of *Carrying* in the *Aire*; *Transforming* themselues into

other *Bodies*; &c. are still reported to be wrought, not by *Incantations*, or *Ceremonies*; But by *Ointments*, and *Anointing* themselves all over. This may iustly moue a *Man* to think, that these *Fables* are the *Effects* of *Imagination*: For it is certaine, that *Ointments* doe all, (if they be laid on any thing thicke) by *Stopping* of the *Pores*, (shut in the *Vapours*, and send them to the *Head* extremely. And for the *Parricular Ingredients* of those *Magickall Ointments*, it is like they are *Opiate* and *Soporiferous*. For *Anointing* of the *Fore-Head*, *Necke*, *Feet*, *Back-Bone*, we know is vsed for *Procuring Dead Sleepes*: And if any *Man* say, that this *Effect* would be better done by *Inward Potions*; Answer may bee made, that the *Medicines*, which go to the *Ointments*, are so strong, that if they were vsed *Inwards*, they would kill those that vse them: And therefore they worke *Potently*, though *Outwards*.

Wee will diuide the *Seuerall Kindes* of the *Operations*, by *Transmission* of *Spirits*, and *Imagination*; Which will giue no small *Light* to the *Experiments* that follow. All *Operations* by *Transmission* of *Spirits*, and *Imagination* haue this; That they *Worke at Distance*, and not at *Touch*; And they are these being distinguished.

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The First is the *Transmission* or *Emission*, of the *Thinner*, and more *Airie Parts* of *Bodies*; As in *Odours*, and *Infections*; And this is, of all the rest, the most *Corporeall*. But you must remember withall, that there be a *Number* of these *Emissions*, both *Wholsome*, and *Unwholsome*, that giue no *Smell* at all: For the *Plague*, many times, when it is taken, giueth no *Scent* at all: And there be many *Good* and *Healthfull Aires*, that doe appeare by *Habitation*, and other *Proofoes*, that differ not in *Smell* from other *Aires*. And vnder this *Head*, you may place all *Imbibitions* of *Aire*, where the *Substance* is *Materiall*, *Odour-like*; Whereof some neuertheless are strange, and very suddenly diffused; As the *Alteration*, which the *Aire* receiueth in *Egypte*, almost immediatly, vpon the *Rising* of the *Riuer* of *Nilus*, whereof we haue spoken.

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The Second is the *Transmission* or *Emission* of those *Things* that we call *Spiritual Species*; As *Visibles*, and *Sounds*: The one whereof wee haue handled; And the other we shall handle in due place. These moue swiftly, and at great distance; But then they require a *Medium* well disposed, And their *Transmission* is easily stopped.

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The Third is the *Emissions*, which cause *Attraction* of *Certaine Bodies* at *Distance*; Wherein though the *Loadstone* be commonly placed in the First *Ranke*, yet we thinke good to except it, and referre it to another *Head*: But the *Drawing* of *Amber*, and *Iet*, and other *Electricke Bodies*; And the *Attraction* in *Gold* of the *Spirit* of *Quick-Silver*, at distance; And the *Attraction* of *Heat* at distance; And that of *Fire* to *Naphtha*; And that of some *Herbs* to *Water*, though at distance; And diuers others; We shall handle, but yet not vnder this present *Title*, but vnder the *Title* of *Attraction* in generall.

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The Fourth is the *Emission* of *Spirits*, and *Immateriate Powers* and *Vertues*, in those Things, which worke by the *Vniuersall Configuration*, and *Sympathy* of the *World*; Not by *Formes*, or *Celestiall Influxes*, (as is vainly taught and receiued,) but by the *Primitive Nature* of *Matter*, and the *Seeds of Things*. Of this kinde is, (as we yet suppose,) the *Working* of the *Load-Stone*, which is by *Consent* with the *Globe* of the *Earth*: Of this Kinde is the *Motion* of *Gravity*, which is by *Consent* of *Dense Bodies*, with the *Globe* of the *Earth*: Of this kinde is some *Disposition* of *Bodies* to *Rotation*, and particularly from *East* to *West*: Of which kinde we conceiue the *Maine Float* and *Re-float* of the *Sea* is, which is by *Consent* of the *Vniuerse*, as Part of the *Diurnall Motion*. These *Immateriate Vertues* haue this Property differing from Others; That the *Diuersity* of the *Medium* hindreth them not; But they passe through all *Mediums*; yet at *Determinate distances*. And of these we shall speake, as they are incident to seuerall *Titles*.

The Fifth is the *Emissions* of *Spirits*; And this is the Principall in our Intention to handle now in this Place: Namely, the *Operation* of the *Spirits* of the *Minde* of *Man*, vpon other *Spirits*: And this is of a *Double Nature*: The *Operations* of the *Affectiōs*, if they be *Vehement*; And the *Operation* of the *Imagination*, if it be *Strong*. But these two are so *Coupled*, as we shall handle them together: For when an *Enniōus*, or *Amorous Affect*, doth infect the *Spirits* of Another, there is Ioyned both *Affectiō*, and *Imagination*.

The Sixth is, the *Influxes* of the *Heauenly Bodies*, besides those two Manifest Ones, of *Heat*, and *Light*. But these we will handle, where we handle the *Celestiall Bodies*, and *Motions*.

The Seuenth is the *Operations* of *Sympathy*; Which the *Writers* of *Naturall Magicke* haue brought into an *Art* or *Precept*: And it is this; That if you desire to Super-induce, any *Vertue* or *Disposition*, vpon a *Person*, you should take the *Living Creature*, in which that *Vertue* is most *Eminent*, and in *Perfection*: Of that *Creature* you must take the *Parts*, wherein that *Vertue* chiefly is *Collocate*: Againe, you must take those *Parts*, in the *Time*, and *Act*, when that *Vertue* is most in *Exercise*; And then you must apply it to that *Part* of *Man*, wherein that *Vertue* chiefly *Consisteth*. As if you would Super-induce *Courage* and *Fortitude*, take a *Lion*, or a *Cock*; And take the *Heart*, *Tooth*, or *Paw* of the *Lion*; Or the *Heart*, or *Spurre* of the *Cock*: Take those *Parts* immediatly after the *Lion*, or the *Cock* haue beene in *Fight*; And let them be worne, vpon a *Mans Heart*, or *Wrest*. Of these and such like *Sympathies*, we shall speake vnder this present *Title*.

The Eighth and last is, an *Emission* of *Immateriate Vertues*; Such as we are a little doubtfull to Propound; It is so prodigious: But that it is so constantly auouched by many: And wee haue set it downe, as a *Law* to our Selues, to examine things to the *Bottom*; And not to receiue vpon *Credit*, or reiect vpon *Improbabilities*, vntill there hath passed a due *Examination*. This is, the *Sympathy* of *Individuals*: For as

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there is a *Sympathy of Species*; So (it may be) there is a *Sympathy of Individuals*: That is, that in *Things*, or the *Parts of Things*, that haue beene once *Contiguous*, or *Entire*, there should remaine a *Transmission of Vertue*, from the One to the Other: As betweene the *Weapon* and the *Wound*. Whereupon is blazed abroad the *Operation of Vnguentum Teli*: And so of a *Peece of Lard*, or *Sticke of Elder*, &c. that if *Part* of it be Consumed or Putrified, it will worke vpon the other *Part Senered*. Now wee will pursue the *Instances* themselves.

Experiments
in Confort
touching Emis-
sion of Spirits
in Vapour, or
Exhalation, O-
dour-like.

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THe *Plague* is many times taken, without *Manifest Sense*, as hath bin said. And they report, that where it is found, it hath a *Sent*, of the *Smell of a Mellow Apple*; And (as some say) of *May-Flowers*: And it is also receiued, that *Smells of Flowers*, that are *Mellow* and *Lushious*, are ill for the *Plague*; As *White Lillies*, *Cowslips*, and *Hyacinths*.

The *Plague* is not easily receiued by such, as continually are about them, that haue the *Plague*; As *Keepers* of the *Sicke*, and *Physitians*; Nor againe by such as take *Antidotes*, either Inward, (as *Mithridate*; *Juniper-Berries*; *Rue*, *Leafe* and *Seed*; &c.) Or outward, (as *Angelica*, *Zedoary*, and the like, in the Mouth; *Terre*, *Galbanum*, and the like, in Perfume;) Nor againe by *Old People*, and such as are of a *Dry* and *Cold Complexion*. On the other side, the *Plague* taketh soonest hold of those, that come out of a *Fresh Aire*; And of those that are *Fasting*; And of *Children*; And it is likewise noted to goe in a *Bloud*, more than to a *Stranger*.

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The most *Pernicious Infection*, next the *Plague*, is the *Smell of the Tayle*; When *Prisoners* haue beene Long, and Close, and Nastily kept; Whereof we haue had, in our time, Experience, twice or thrice; when both the *Judges* that sate vpon the *Tayle*, and Numbers of those that attended the *Businesse*, or were present, *Sickned* vpon it, and *Died*. Therefore it were good wisdome, that in such Cases, the *Tayle* were Aired, before they be brought forth.

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Out of question, if such *Foule Smells* bee made by *Art*, and by the *Hand*, they consist chiefly of *Mans Flesh*, or *Sweat*, *Putrified*; For they are not those *Stinkes*, which the *Nostrils* streight abhorre, and expell, that are most *Pernicious*; But such *Aires*, as haue some Similitude with *Mans Body*; And so insinuate themselves, and betray the *Spirits*. There may be great danger, in vsing such Compositions, in great Meetings of People, within Houses; As in *Churches*; At *Arraignments*; At *Playes* and *Solemnities*; And the like; For *Poisoning of Aire* is no lesse dangerous than *Poisoning of Water*; Which hath beene vsed by the *Turkes* in the *Warres*; And was vsed by *Emanuel Commenus* towards the *Christians*, when they passed thorow his *Countray* to the *Holy Land*. And these *Empoisonments of Aire*, are the more dangerous in *Meetings of People*; Because the much *Breath of People*, doth further the *Reception of the Infection*: And therefore, where any such Thing is feared, it were good, those *Publique Places* were perfumed, before the *Assemblies*.

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The *Empoisonment* of Particular *Persons*, by *Odours*, hath beene reported

ported to be in *Perfumed Gloues*, or the like: And it is like, they Mingle the *Poison* that is deadly, with some *Smells* that are Sweet, which also maketh it the sooner received. *Plagues* also haue been raised by *Anointings* of the *Chinkes* of *Doores*, and the like; Not so much by the Touch, as for that it is common for *Men*, when they finde any thing Wet vpon their *Fingers*, to put them to their *Nose*; Which *Men* therefore should take heed how they doe. The best is, that these *Compositions* of *Infectious Aires*, cannot be made without *Danger* of *Death*, to them that make them. But then againe, they may haue some *Antidotes* to saue themselves; So that *Men* ought not to be secure of it.

There haue beene, in diuers *Countries*, great *Plagues*, by the *Putrefaction*, of great *Swarmes* of *Grasse-Hoppers*, and *Locusts*, when they haue beene dead, and cast vpon *Heaps*.

It hapneth oft in *Mines*, that there are *Damps*, which kill, either by *Suffocation*, or by the *Poisonous Nature* of the *Minerall*: And those that deale much in *Refining*, or other *Workes* about *Metalls*, and *Mineralls*, haue their *Brains* Hurt and Stupified by the *Metalline Vapors*. Amongst which, it is noted, that the *Spirits* of *Quick-Siluer*, either fly to the *Skull*, *Teeth*, or *Bones*; In so much as *Gilders* vse to haue a *Peece* of *Gold* in their *Mouth*, to draw the *Spirits* of the *Quick-Siluer*; Which *Gold* afterwards they finde to be *Whitened*. There are also certaine *Lakes*, and *Pits*, such as that of *Auernus*, that *Poison Birds* (as is said) which fly ouer them; Or *Men*, that stay too long about them.

The *Vapour* of *Char-coale*, or *Sea-Coale*, in a *Close Roome*, hath killed many: And it is the more dangerous, because it commeth without any *Ill Smell*; But stealeth on by little and little; Enducing only a *Faintnesse*, without any *Manifest Strangling*. When the *Dutch Men* Wintred at *Nova Zembla*, and that they could gather no more *Sticks*, they fell to make *Fire* of some *Sea-Cole* they had, wherewith (at first) they were much refreshed; But a little after they had sit about the *Fire*, there grew a *Generall Silence*, and lothnesse to speake amongst them; And immediatly after, One of the *Weakest* of the *Company*, fell downe in a *Swone*; Whereupon they doubting what it was, opened their doore, to let in *Aire*, and so saued themselves. The *Effect* (no doubt) is wrought by the *Inspissation* of the *Aire*; And so of the *Breath* and *Spirits*. The like ensueth in *Roomes* newly *Plastered*, if a *Fire* be made in them; Whereof no lesse *Man* than the *Emperour Iouinianus* Died.

Vide the *Experiment*, 803. touching the *Infectious Nature* of the *Aire*, vpon the first *Showers*, after a long *Drought*.

It hath come to passe, that some *Apothecaries*, vpon *Stamping* of *Coloquintida*, haue beene put into a great *Skouring*, by the *Vapour* only.

It hath beene a *Practice* to burne a *Pepper*, they call *Ginny-Pepper*; Which hath such a strong *Spirit*, that it prouoketh a *Continuall Sneezing*, in those that are in the *Roome*.

It is an *Ancient Tradition*, that *Bleare-Eyes* infect *Sound-Eyes*; And that a *Menstruous Woman*, looking vpon a *Glasse*, doth rust it. Nay they

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haue an Opinion, which seemeth *Fabulous*; That *Menstruous Women*, going ouer a *Field*, or *Garden*, doe *Corne* and *Herbs* good by *Killing* the *Wormes*.

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The *Tradition* is no lesse *Ancient*, that the *Basiliske* killeth by *Aspect*; And that the *Wolfe*, if he see a *Man* first, by *Aspect* striketh a *Man* hoarse.

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Perfumes Conuenient doe dry and strengthen the *Braine*; And stay *Rheumes* and *Defluxions*; As we finde in *Fume* of *Rose-Mary* dried, and *Lignum Aloës*, and *Calamus*, taken at the *Mouth*, and *Nostrils*; And no doubt there be other *Perfumes*, that doe moisten and refresh; And are fit to be vsed in *Burning Agues*, *Consumptions*, and too much *Wakefulness*; Such as are, *Rose-Water*, *Vinegar*, *Limon-Pils*, *Violets*, the *Leanes* of *Vines* sprinkled with a little *Rose-Water*, &c.

926

They doe vse in *Sudden Faintings*, and *Swounings*, to put a *Handkerchiefe* with *Rose-Water*, or a *Little Vinegar*, to the *Nose*; Which gathereth together againe the *Spirits*, which are vpon point to resolute, and fall away.

927

Tobacco comforteth the *Spirits*, and dischargeth *Wearinesse*; Which it worketh partly by *Opening*; But chiefly by the *Opiate Vertue*, which condenseth the *Spirits*. It were good therefore to try the *Taking* of *Fumes* by *Pipes*, (as they doe in *Tobacco*,) of other *Things*; As well to dry and comfort, as for other *Intentions*. I wish *Trial* be made of the *Drying Fume*, of *Rose-Mary*, and *Lignum Aloës*, before mentioned, in *Pipe*; And so of *Nutmeg*, and *Folium Indum*; &c.

928

The *Following* of the *Plough*, hath beene approued, for *Refreshing* the *Spirits*, and *Procuring Appetite*: But to doe it in the *Ploughing* for *Wheat*, or *Rie*, is not so good; Because the *Earth* hath spent her *Sweet Breath*, in *Vegetables*, put forth in *Summer*. It is better therefore to doe it, when you sow *Barley*. But because *Ploughing* is tied to *Seasons*, it is best to take the *Asse* of the *Earth*, new turned vp, by *Digging* with the *Spade*; Or *Standing* by him that *Diggeth*. *Gentlewomen* may doe themselves much good by kneeling vpon a *Cushion*, and *Weeding*. And these *Things* you may practise in the best *Seasons*; Which is euer the *Early Spring*, before the *Earth* putteth forth the *Vegetables*; And in the *Sweetest Earth* you can chuse. It would be done also, when the *Dew* is a little off the *Ground*, lest the *Vapour* be too *Moist*. I knew a great *Man*, that liued Long, who had a *Cleane Clod* of *Earth*, brought to him euery *Morning*, as he late in his *Bed*; And he would hold his *Head* ouer it, a good pretty while. I commend also, sometimes, in *Digging* of *New Earth*, to powre in some *Malmesey*, or *Greeke Wine*; That the *Vapour* of the *Earth*, and *Wine* together, may comfort the *Spirits*, the more; Prouided alwaies, it be not taken, for a *Heathen Sacrifice*, or *Libation* to the *Earth*.

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They haue, in *Physicke*, Vse of *Pomanders*, and *Knots* of *Powders*, for *Drying* of *Rheumes*, *Comforting* of the *Heart*, *Prouoking* of *Sleepe*, &c. For though those *Things* be not so *Strong* as *Perfumes*, yet you may haue them continually in your *Hand*; whereas *Perfumes* you can take but at

Times;

Times; And besides, there be diuers *Things*, that breath better of them selues, than when they come to the *Fire*; As *Nigelia Romana*, the *Seed* of *Melanthium*, *Amomum*, &c.

There be two *Things*, which (inwardly vsed) doe Coole and condense the *Spirits*; And I with the same to be tried outwardly in *Vapours*. The One is *Nitre*, which I would haue dissolued in *Malmesey*, or *Greeke-Wine*, and so the *Smell* of the *Wine* taken; Or if you would haue it more forcible, poure of it vpon a *Fire-pan*, well heated, as they doe *Rose-Water*, and *Vinegar*. The other is, the *Distilled Water* of *Wilde Poppy*; which I wish to be mingled, at halfe, with *Rose-Water*, and so taken with some *Mixture* of a few *Cloues*, in a *Perfuming-Pan*. The like would be done with the *Distilled Water* of *Saffron Flowers*.

Smells of *Muske*, and *Amber*, and *Cinit*, are thought to further *Venerous Appetite*: Which they may doe by the *Refreshing* and *Calling forth* of the *Spirits*.

Incense, and *Nidorous Smells*, (such as were of *Sacrifices*,) were thought to Intoxicate the *Braine*, and to dispose *Men* to *Deuotion*: Which they may doe, by a kinde of *Sadnesse*, and *Contristation* of the *Spirits*: And partly also by *Heating*, and *Exalting* them. We see, that amongst the *Jewes*, the *Principall Perfume* of the *Sanctuary*, was forbidden all *Common Vses*.

There be some *Perfumes*, prescribed by the *Writers* of *Naturall Magicke*, which procure *Pleasant Dreames*; And some others, (as they say,) that procure *Propheticall Dreames*; As the *Seeds* of *Flax*, *Fleawort*, &c.

It is certaine, that *Odours* doe, in a small Degree, *Nourish*; Especial-ly the *Odour* of *Wine*: And we see *Men* a hungred, doe loue to smell *Hot Bread*. It is related, that *Democritus*, when he lay a dying, heard a *Woman*, in the *House*, complaine, that she should be kept from being at a *Feast*, and *Solemnity*, (which shee much desired to see,) because there would be a *Corps* in the *House*; Whereupon he caused *Loanes* of *New Bread* to be sent for, and opened them; And powred a little *Wine* into them; And so kept himselfe alieue with the *Odour* of them, till the *Feast* was past. I knew a *Gentleman*, that would fast (sometimes) three or foure, yea five dayes, without *Meat*, *Bread*, or *Drinke*; But the same *Man* vsed to haue continually, a great *Wisse* of *Herbes*, that he smelled on: and amongst those *Herbes*, some *Esculent Herbes* of strong *Sent*; As *Onions*, *Garlicke*, *Leekes*, and the like.

They doe vse, for the *Accident* of the *Mother*, to burne *Feathers*, and other *Things* of ill *Odour*: And by those ill *Smells*, the *Rising* of the *Mother* is put downe.

There be *Aires*, which the *Physitians* aduise their *Patients* to remoue vnto, in *Consumptions*, or vpon *Reconery* of *Long Sicknesse*: Which (commonly) are *Plaine Champaignes*, but *Grasing*, and not *Over-growne* with *Heath*, or the like: Or else *Timber-Shades*, as in *Forrests*, and the like. It is noted also, that *Groues* of *Bayes* doe torbid *Pestilent Aires*; Which was accounted

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accounted a great Cause of the Wholesome Aire of *Antiochia*. There be also some Soyles that put forth *Odorate Herbes* of themselves; As *Wilde Thyme*; *Wilde Maioram*; *Penny-Roiall*; *Camomill*; And in which the *Briar-Roses* smell almost like *Muske-Roses*; Which (no doubt) are *Signes* that doe discouer an *Excellent Aire*.

937

It were good for Men, to thinke of hauing *Healthfull Aire*, in their Houses; Which will neuer be, if the *Roomes* be *Low-roofed*, or full of *Windows*, and *Doores*; For the one maketh the *Aire Close*, and not *Fresh*; And the other maketh it *Exceeding Vnequall*; Which is a great Enemy to *Health*. The *Windows* also should not be high vp to the *Roofe*, (which is in vse for Beauty, and Magnificence,) but *Low*. Also *Stone-Walls* are not wholesome; But *Timber* is more wholesome; And especially *Brick*. Nay it hath beene vsed by some, with great Successe, to make their *Walls* thicke; And to put a Lay of *Chalke* betweene the *Brickes*, to take away all *Dampishnesse*.

Experiment
Solitary, touch-
ing the E-
missions of Spi-
rituall Species
which Affect
the Senses.

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These *Emissions*, (as we said before,) are handled, and ought to be handled, by themselves, vnder their *Proper Titles*: That is, *Visibles*, and *Audibles*. each a-part: In this Place, it shall suffice to giue some generall *Observations*, Common to both. First, they seeme to be *Incorporeall*. Secondly, they *Worke Swiftly*. Thirdly, they *Worke at Large Distances*. Fourthly, in *Curious Varieties*. Fifthly, they are not *Effectiue* of any Thing; Nor leaue no *Worke* behind them; But are *Energies* meerely; For their *Working* vpon *Mirroures*, and *Places of Echo*, doth not alter any Thing in those *Bodies*; But it is the same *Action* with the *Originall*, only *Repercussed*. And as for the *Shaking* of *Windows*, or *Rarefying* the *Aire* by *Great Noyses*; And the *Heat* caused by *Burning-Glasses*; They are rather *Concomitants* of the *Audible*, and *Visible Species*, than the *Effects* of them. Sixthly, they seeme to be of so *Tender*, and *Weake a Nature*, as they affect only such a *Rare*, and *Attenuate Substance*, as is the *Spirit* of *Living Creatures*.

Experiments
in Consort,
touching the
Emission of Im-
material Vertues
from the
Minds, and
Spirits of Men,
either by Affe-
ctions, or by
Imaginations, or
by other Im-
pressions.

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It is mentioned in some *Stories*, that where *Children* haue beene *Exposed*, or taken away young from their *Parents*; And that afterwards they haue approached to their *Parents* presence, the *Parents*, (though they haue not knowne them,) haue had a *Secret Ioy*, or *Other Alteration* thereupon.

There was an *Egyptian South-Sayer*, that made *Anthoni* beleue, that his *Genius*, (which otherwise was *Brave*, and *Confident*;) was, in the Presence of *Octavianus Caesar*, *Poore*, and *Cowardly*: And therefore, hee aduised him, to absent himselfe, (as much as hee could,) and remoue farre from him. This *South-Sayer* was thought to be suborned by *Cleopatra*, to make him liue in *Egypt*, and other *Remote Places* from *Rome*. Howsoeuer the Conceit of a *Predominant* or *Mastering Spirit*, of one *Man* ouer Another, is *Ancient*, and *Receiued still*, euen in *Vulgar Opinion*.

There

There are Conceits, that some Men, that are of an *Ill*, and *Melanchely Nature*, doe incline the *Company*, into which they come, to be *Sad*, and *Ill disposed*; And contrariwise, that Others, that are of a *Iouiall Nature*, doe dispose the *Company* to be *Merry* and *Cheerefull*. And againe, that some Men are *Luckie* to be kept *Company* with, and *Empløyed*; And Others *Vnluckie*. Certainly, it is agreeable to *Reason*, that there are, at the least, some *Light Effluxions* from *Spirit* to *Spirit*, when Men are in *Presence* one with another, as well as from *Body* to *Body*.

It hath beene obserued, that *Old Men*, who haue loued *Young Company*, and beene Conuerfant continually with them, haue beene of *Long Life*; Their *Spirits*, (as it seemeth,) being Recreated by such *Company*. Such were the *Ancient Sophists*, and *Rhetoricians*; Which euer had *Young Auditours*, and *Disciples*; As *Gorgias*, *Protagoras*, *Isocrates*, &c. Who liued till they were an Hundred yeares Old. And so likewise did many of the *Grammarians*, and *Schoole-Masters*; such as was *Orbilus*, &c.

Audacitie and *Confidence* doth, in Ciuill Businesse, so great Effects, as a Man may (reasonably) doubt, that besides the very *Daring*, and *Earnestnesse*, and *Persisting* and *Importunitie*, there should be some *Secret Binding*, and *Scooping* of other Mens *Spirits*, to such Persons.

The *Affections* (no doubt) doe make the *Spirits* more *Powerfull*, and *Active*; And especially those *Affections*, which draw the *Spirits* into the *Eyes*: Which are two: *Loue*, and *Enuy*, which is called *Oculus Malus*. As for *Loue*, the *Platonists*, (some of them,) goe so farre, as to hold that the *Spirit* of the *Louer*, doth passe into the *Spirits*, of the *Person Loved*; Which causeth the desire of *Returne* into the *Body*, whence it was *Emitted*: Whereupon followeth that *Appetite* of *Contact*, and *Coniunction*, which is in *Louers*. And this is obserued likewise, that the *Aspects* that procure *Loue*, are not *Gazings*, but *Sudden Glances*, and *Darings* of the *Eye*. As for *Enuy*, that emitteth some *Maligne* and *Poisonous Spirit*, which taketh hold of the *Spirit* of Another; And is likewise of greatest Force, when the *Cast* of the *Eye* is *Oblique*. It hath beene noted also, that it is most Dangerous, when an *Enuious Eye* is cast vpon Persons in *Glory*, and *Triumph*, and *Ioy*. The *Reason* whereof is, for that, at such times, the *Spirits* come forth most, into the *Outward Parts*, and so meet the *Percussion* of the *Enuious Eye*, more at *Hand*: And therefore it hath beene noted, that after great *Triumphs*, Men haue beene ill disposed, for some Dayes following. Wee see the Opinion of *Fascination* is Ancient, for both Effects; Of Procuring *Loue*; And *Sicknesse* caused by *Enuy*: And *Fascination* is euer by the *Eye*. But yet if there be any such *Infection* from *Spirit* to *Spirit*, there is no doubt, but that it worketh by *Presence*, and not by the *Eye* alone; Yet most forcibly by the *Eye*.

Feare, and *Shame*, are likewise *Infectiue*; for wee see that the *Staring* of one will make another readie to *Start*: And when one Man is out of *Countenance* in a *Company*, others doe likewise *Blush* in his behalfe.

Now

Now we will speake of the Force of *Imagination* vpon other *Bodies*; And of the *Meanes* to *Exalt* and *Strengthen* it. *Imagination*, in this Place, I vnderstand to be, the *Representation* of an *Indiuiduall Thought*. *Imagination* is of three *Kinds*; The First *Ioynd* with *Beleeefe* of that which is to *Come*: The Second *Ioynd* with *Memory* of that which is *Past*: And the Third is of *Things Present*, or as if they were *Present*; For I comprehend in this, *Imaginations Faigned*, and at *Pleasure*; As if one should *Imagine* such a *Man* to be in the *Vestments* of a *Pope*; Or to haue *Wings*. I single out, for this time, that which is with *Faith*, or *Beleeefe* of that which is to *Come*. The *Inquisition* of this *Subiect*, in our way, (which is by *Induction*,) is wonderfull hard; for the *Things* that are reported, are full of *Fables*; And *New Experiments* can hardly be made, but with *Extreme Caution*, for the *Reason* which we will hereafter declare.

The *Power* of *Imagination* is in three *Kindes*; The First, vpon the *Body* of the *Imaginant*; Including likewise the *Childe* in the *Mothers Wombe*; The Second is, the *Power* of it vpon *Dead Bodies*, as *Plants*, *Wood*, *Stone*, *Metal*, &c. The Third is, the *Power* of it, vpon the *Spirits* of *Men* and *Liuing Creatures*: And with this last we will only meddle.

The *Probleme* therefore is, whether a *Man Constantly* and *Strongly Beleeuing*, that such a *Thing* shall be; (As that such an *One* will *Loue Him*; Or that such an *One* will *Grant him his Request*; Or that such an *One* shall *Recouer a Sicknesse*; Or the like;) It doth helpe any thing to the *Effecting* of the *Thing* it selfe. And here againe we must warily distinguish; For it is not meant, (as hath beene partly said before,) that it should helpe by *Making* a *Man* more *Stout*, or more *Industrious*; (In which kinde a *Constant Beleeefe* doth much;) But meerely by a *Secret Operation*, or *Binding*, or *Changing* the *Spirit* of *Another*: And in this it is hard, (as we began to say,) to make any *New Experiment*; For I cannot *command* my *Selfe* to *Beleeue* what I will, and so no *Triall* can be made. Nay it is worse; For whatsoeuer a *Man Imagineth* doubttingly, or with *Feare*, must needs doe hurt, if *Imagination* haue any *Power* at all;

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For a *Man* representeth that oftner, that he feareth, than the contrary.

The Helpe therefore is, for a *Man* to worke by *Another*, in whom he may Create *Beleeve*, and not by *Himselfe*; Vntill *Himselfe* haue found by *Experience*, that *Imagination* doth preuaile; For then *Experience* worketh in *Himselfe* *Beleeve*; If the *Beleeve*, that such a *Thing* shall be, be ioyned with a *Beleeve*, that his *Imagination* may procure it.

For Example; I related one time to a *Man*, that was Curious, and Vaine enough in these Things; *That I saw a Kinde of Iugler, that had a Paire of Cards, and would tell a Man what Card he thought.* This Pretended Learned Man told me; It was a Mistaking in Me; For (*said hee*) *it was not the Knowledge of the Mans Thought, (for that is Proper to God,) but it was the Inforcing of a Thought vpon him, and Binding his Imagination by a Stronger, that he could Thinke no other Card.* And thereupon he asked me a *Question*, or two, which I thought he did but cunningly, knowing before what vsed to be the Feats of the Iugler. *Sir, (said he,) doe you remember whether he told the Card, the Man thought, Himselfe, or bade Another to tell it.* I answered (as was true;) *That he bade Another tell it.* Whereunto he said; *So I thought: For (said he) Himselfe could not haue put on so strong an Imagination; But by telling the other the Card, (who beleened that the Iugler was some Strange Man, and could doe Strange Things,) that other Man caught a strong Imagination.* I harkened vnto him, thinking for a Vanity he spoke prettily. Then he asked me another *Question*: *Saith he; Doe you remember, whether he bade the Man thinke the Card first, and afterwards told the other Man in his Eare, what hee should thinke, Or else that he did whisper first in the Mans Eare, that should tell the Card, telling that such a Man should thinke such a Card, and after bade the Man thinke a Card?* I told him, as was true; *That he did first whisper the Man in the Eare, that such a Man should thinke such a Card: Vpon this the Learned Man did much Exult, and Please himselfe, saying; Loe, you may see that my Opinion is right: For if the Man had thought first, his Thought had beene Fixed; But the other Imagining first, bound his Thought.* Which though it did somewhat sinke with mee, yet I made it Lighter than I thought, and said; *I thought it was Confederacie, betweene the Iugler, and the two Seruants: Though (Indeed) I had no Reason so to thinke: For they were both my Fathers Seruants; And he had neuer plaid in the House before. The Iugler also did cause a Garter to be held vp; And tooke vpon him, to know, that such a One, should point in such a Place, of the Garter; As: should be neare so many Inches to the Longer End, and so many to the Shorter; And still he did it, by First Telling the Imaginer, and after Bidding the Actor Thinke.*

Hauiing told this Relation, not for the Weight thereof, but because

because it doth handsomely open the *Nature* of the *Question*; I returne to that I said; That *Experiments* of *Imagination*, must be practised by Others, and not by a *Mans* Selfe. For there be Three *Meanes* to fortifie *Beleeve*: The First is *Experience*: The Second is *Reason*: And the Third is *Authoritie*: And that of these, which is farre the most *Potent*, is *Authoritie*: For *Beleeve* vpon *Reason*, or *Experience*, will Stagger.

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For *Authoritie*, it is of two Kindes; *Beleeve* in an *Art*; And *Beleeve* in a *Man*. And for Things of *Beleeve* in an *Art*; A *Man* may exercise them by *Himselfe*; But for *Beleeve* in a *Man*, it must be by *Another*. Therefore, if a *Man* beleeue in *Astrologie*, and finde a *Figure* Prosperous; Or beleeue in *Naturall Magicke*, and that a *Ring* with such a *Stone*, or such a *Peece* of a *Living Creature*, Carried, will doe good; It may helpe his *Imagination*: But the *Beleeve* in a *Man* is farre the more *Active*. But howsoeuer, all *Authoritie* must be out of a *Mans* Selfe, turned (as was said,) either vpon an *Art*, or vpon a *Man*: And where *Authoritie* is from one *Man* to another, there the Second must be *Ignorant*, and not *Learned*, or *Full of Thoughts*; And such are (for the most part) all *Witches*, and *Superstitious Persons*; Whose *Beleeves*, tied to their *Teachers*, and *Traditions*, are no whit controlled, either by *Reason*, or *Experience*: And vpon the same Reason, in *Magicke*, they vse (for the most part,) *Boyes*, and *Young People*; whose *Spirits* easiliest take *Beleeve*, and *Imagination*.

Now to fortifie *Imagination*, there be three *Wayes*: The *Authoritie* whence the *Beleeve* is deriued; *Meanes* to *Quicken* and *Corroborate* the *Imagination*; And *Meanes* to *Repeat* it, and *Refresh* it.

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For the *Authoritie*, wee haue already spoken; As for the Second; Namely the *Meanes* to *Quicken*, and *Corroborate* the *Imagination*; We see what hath beene vsed in *Magick*; (If there be in those Practises any thing that is purely *Naturall*;) As *Vestments*; *Characters*; *Words*; *Seales*; Some *Parts* of *Plants*, or *Living Creatures*; *Stones*; *Choice* of the *Houre*; *Gestures* and *Motions*; Also *Incenses*, and *Odours*; *Choice* of *Society*, which increaseth *Imagination*; *Diets* and *Preparations* for some time before. And for *Words*, there haue beene euer vsed, either *Barbarous Words*, of no Sense, lest they should disturbe the *Imagination*; Or *Words* of *Similitude*, that may second and feed the *Imagination*: And this was euer as well in *Heathen Charmes*, as in *Charmes* of latter Times. There are vsed also *Scripture Words*; For that the *Beleeve*, that *Religious Texts*, and *Words*, haue Power, may strengthen the *Imagination*. And for the same Reason, *Hebrew Words*, (which amongst vs is counted the *Holy Tongue*, and the *Words* more *Mysticall*;) are often vsed.

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For the *Refreshing* of the *Imagination*, (which was the Third *Meanes* of *Exalting* it;) Wee see the Practices of *Magicke*; as in *Images* of *Wax*,
and

and the like, that should Melt by little, and little; Or some other *Things Buried in Mucke*, that should Putrifie by little and little; Or the like: For so oft as the *Imaginant* doth thinke of those *Things*, so oft doth he represent to his *Imagination*, the *Effect* of that he desireth.

If there be any *Power* in *Imagination*, it is lesse credible, that it should be so *Incorporeall* and *Immateriall* a *Vertue*, as to worke at great *Distances*; Or through all *Mediums*; Or vpon all *Bodies*: But that the *Distance* must be *Competent*; The *Medium* not *Aduerse*; And the *Body* *Apt* and *Proportionate*. Therefore if there be any *Operation* vpon *Bodies*, in *Absence*, by *Nature*; it is like to be conueyed from *Man* to *Man*, as *Fame* is; As if a *Witch* by *Imagination*, should hurt any *afarre* off, it cannot bee naturally, but by *Working* vpon the *Spirit* of some, that commeth to the *Witch*; And from that *Party* vpon the *Imagination* of *Another*; And so vpon *Another*; till it come to one that hath resort to the *Party Intended*; And so by *Him* to the *Party intended himselfe*. And although they speake, that it sufficeth, to take a *Point*, or a *Peece* of the *Garment*, or the *Name* of the *Party*, or the like; yet there is lesse *Credit* to bee giuen to those *Things*, except it be by *Working* of euill *Spirits*.

The *Experiments*, which may certainly demonstrate the *Power* of *Imagination*, vpon other *Bodies*, are few, or none: For the *Experiments* of *Witchcraft*, are no cleare *Proofes*; For that they may be, by a *Tacite Operation* of *Maligne Spirits*: We shall therefore be forced, in this *Enquirie*, to resort to *New Experiments*: Wherein we can giue only *Directions* of *Trials*, and not any *Positive Experiments*. And if any *Man* thinke, that wee ought to haue staied, till wee had made *Experiment*, of some of them, our selues, (as wee doe commonly in other *Titles*) the *Truth* is, that these *Effects* of *Imagination* vpon other *Bodies*, haue so little *Credit* with vs, as we shall try them at leisure: But in the meane *Time*, we will lead others the way.

When you worke by the *Imagination* of *Another*, it is necessary, that He, by whom you worke, haue a *Precedent Opinion* of you, that you can doe *Strange Things*; Or that you are a *Man of Art*, as they call it; For else the *Simple Affirmation* to *Another*, that this or that shall bee, can worke but a weake *Impression*, in his *Imagination*.

It were good, because you cannot discern fully of the *Strength* of *Imagination*, in one *Man* more than another, that you did vse the *Imagination* of more than *One*; That so you may light vpon a *Strong One*. As if a *Physitian* should tell *Three*, or *Foure*, of his *Patients Seruants*, that their *Master* shall surely recouer.

The *Imagination* of *One*, that you shall vse, (such is the *Variety* of *Mens Mindes*,) cannot be alwaies alike *Constant*, and *Strong*; And if the

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Successes follow not speedily, it will faint and lesse Strength. To remedy this, you must pretend to Him, whose *Imagination* you use, severall Degrees of Meanes, by which to Operate; As to prescribe him, that every three Daies, if he finde not the Successes Apparant, he doe use another Root, or Part of a Beast, or Ring, &c. As being of more Force; And if that faile, Another; And if that, Another; till Seven Times. Also you must prescribe a good Large Time for the Effect you promise; As if you should tell a Servant of a Sick-man, that his Master shall recover, but it will be Fourteene daies, ere hee findeth it apparantly, &c. All this to entertaine the *Imagination*, that it waver lesse.

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It is certaine, that *Potions*, or *Things* taken into the Body: *Incenses* and *Perfumes* taken at the *Nostrils*; And *Ointments* of some Parts, doe (naturally) worke vpon the *Imagination* of Him that taketh them. And therefore it must needs greatly Cooperate with the *Imagination* of him, whom you use, if you prescribe him, before he doe use the Receipt, for the Worke which he desireth, that he doe take such a Pill, or a Spoonfull of Liquor; Or burne such an Incense; Or Anoint his Temples, or the Soles of his Feet, with such an Ointment, or Oyle: And you must chuse, for the Composition of such Pill, Perfume, or Ointment, such Ingredients, as doe make the Spirits, a little more Grosse, or Muddy: Whereby the *Imagination* will fix the better.

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The Body Passive, and to be Wrought Vpon, (I meane not of the *Imaginant*), is better wrought vpon (as hath beene partly touched) at some Times, than at others: As if you should prescribe a Servant, about a Sick Person (whom you have possessed, that his Master shall recover) when his Master is fast asleepe, to use such a Root, or such a Root. For *Imagination* is like to worke better vpon Sleeping Men, than Men Awake. As we shall shew when we handle Dreames.

956

Wee finde in the Art of Memory, that *Images Visible*, worke better than other Conceits: As if you would remember the Word Philosophy, you shall more surely doe it, by Imagining that such a Man, (For Men are best Places) is reading vpon *Aristotiles Physickes*; Than if you should Imagine him to say; I'll goe study Philosophy. And therefore, this Observation would be translated to the Subject wee now speake of: For the more Lustrous the *Imagination* is, it filleth and fixeth the better. And therefore I conceive, that you shall, in that Experiment (whereof wee spake before) of Binding of Thoughts, lesse faile, if you tell One, that such an One shall name one of Twenty Men, than if it were One of Twenty Cards. The Experiment of Binding of Thoughts, would be Diversified, and tried to the Full: And you are to note, whether it hit for the most part, though not alwaies.

957

It is good to consider, vpon what Things, *Imagination* hath most Force: And the Rule (as I conceive) is, that it hath most Force vpon Things, that haue the Lightest, and Easiest Motions. And therefore about all, vpon the Spirits of Men: And in them, vpon such Affections, as move Lightest; As vpon Procuring of Love; Binding of Lust, which is

euier with *Imagination*; vpon *Men* in *Feare*; Or *Men* in *Irresolution*; And the like. Whatsoeuer is of this kinde would be thoroughly enquired. *Trialls* likewise would be made vpon *Plants*, and that diligently: As if you should tell a *Man*, that such a *Tree* would Die this yeere; And will him, at these and these times, to goe vnto it, to see how it thruieth. As for *Inanimate Things*, it is true, that the *Motions* of *Shuffling* of *Cards*, or *Casting* of *Dice*, are very *Light Motions*; And there is a *Folly* very vsuall, that *Gamesters* imagine, that some that stand by them, bring them ill *Lucke*. There would be *Triall* also made, of holding a *Ring* by a *Threed* in a *Glasse*, and telling him that holdeth it, before, that it shall strike so many times against the *Side* of the *Glasse*, and no more; Or of Holding a *Key* betwene two *Mens Fingers*, without a *Charme*; And to tell those that hold it, that at such a *Name*, it shall goe off their *Fingers*. For these two are *Extreme Light Motions*. And howsoeuer I haue no *Opinion* of these things, yet so much I conceiue to be true, That *Strong Imagination* hath more Force vpon *Things Liuing*; Or that haue beene *Liuing*, than *Things* meere *Inanimate*: And more Force likewise vpon *Light*, and *Subtill Motions*, than vpon *Motions Vehement*, or *Ponderous*.

It is an vsuall *Observation*, that if the *Body* of One *Murdered*, bee brought before the *Murderer*, the *Wounds* will bleed afresh. Some doe affirme, that the *Dead Body*, vpon the *Presence* of the *Murderer*, hath opened the *Eyes*; And that there haue beene such like *Motions*, as well where the *Party Murdered* hath beene *Strangled*, or *Drowned*, as where they haue beene *Killed* by *Wounds*. It may be, that this participateth of a *Miracle*, by *Gods* Iust Iudgement, who vsuall bringeth *Murders* to *Light*: But if it be *Naturall*, it must be referred to *Imagination*.

The *Tying* of the *Point* vpon the day of *Marriage*, to make *Men* Impotent towards their *Wives*, which (as we haue formerly touched,) is so frequent in *Zant* and *Gascony*, if it be *Naturall*, must bee referred to the *Imagination* of Him that Ties the *Point*. I conceiue it to haue the lesse *Affinity* with *Witchcraft*, because not *Peculiar* Persons onely, (such as *Witches* are) but any *Body* may doe it.

There be many *Things*, that worke vpon the *Spirits* of *Man*, by *Secret Sympathy*, and *Antipathy*: The *Vertues* of *Precious Stones*, worne, haue bin anciently and generally Receiued; And curiously assigned to worke severall *Effects*. So much is true; That *Stones* haue in them fine *Spirits*; As appeareth by their *Splendor*: And therefore they may worke by *Consent* vpon the *Spirits* of *Men*, to *Comfort*, and *Exhilarate* them. Those that are the best, for that *Effect*, are the *Diamond*, the *Emerald*, the *Iacinth Orientall*, and the *Gold-Stone*, which is the *Yellow Topaze*. As for their particular *Proprieties*, there is no *Credit* to be giuen to them. But it is manifest, that *Light*, aboue all things, excelleth in *Comforting* the *Spirits* of *Men*: And it is very probable, that *Light Varied* doth the same *Effect*, with more *Novelty*. And this is one of the *Causes*, why *Precious Stones* comfort. And therefore it were good to haue *Tincted Lanthornes*,

Experiments
in Consort,
touching the
Secret Vertue of
Sympathy, and
Antipathy.

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or Tincted Skreenes, of Glasse Coloured into Greene, Blew, Carnation, Crimson, Purple, &c. And to vse them with Candles in the Night. So likewise to haue Round Glasses, not only of Glasse Coloured thorow, but with Colours laid betweene Crystals, with Handles to hold in ones Hand. Prismes are also Comfortable Things. They haue of Paris-Worke, Looking-Glasses, bordered with broad Borders of small Crystall, and great Counterfeit Pretious Stones, of all Colours, that are most Glorious and Pleasant to behold; Especially in the Night. The Pictures of Indian Feathers, are likewise Comfortable, and Pleasant to behold. So also Faire and Cleere Pooles doe greatly comfort the Eyes and Spirits; Especially when the Sun is not Glaring, but Over-cast; Or when the Moone shineth.

961

There be diuers Sorts of Bracelets fit to Comfort the Spirits; And they be of Three Intentions: Refrigerant; Corroborant; and Aperient. For Refrigerant, I with them to be of Pearle, or of Corall, as is vsed: And it hath beene noted that Corall, if the Party that weareth it be ill disposed, will wax Pale: Which I beleue to be true, because otherwise Distemper of Heat will make Corall lose Colour. I commend also Beads, or little Plates of Lapis Lazuli; And Beads of Nitre, either alone, or with some Cordiall Mixture.

820
962

For Corroboration and Confortation, take such Bodies as are of Astringent Quality, without Manifest Cold. I commend Bead-Amber; which is full of Astriction, but yet is Viscuous, and not Cold; And is conceiued to Impinguate those that weare such Beads: I commend also, Beads of Harts-Horne, and Iuory, which are of the like Nature; Also Orange-Beads; Also Beads of Lignum Aloës, Macerated first in Rose-Water, and Dried.

963

For Opening, I commend Beads, or Peeces of the Roots of Carduus Benedictus: Also of the Roots of Piony the Male; And of Orris; And of Calamus Aromaticus; And of Rew.

964

The Crampe, (no doubt,) commeth of Contraction of Sinnewes; Which is Manifest, in that it commeth either by Cold or Drinesse; As after Consumptions, and Long Agues: For Cold and Drinesse doe (both of them) Contract, and Corrugate. We see also, that Chafing a little about the Place in paine, easeth the Crampe; Which is wrought by the Dilatation, of the Contracted Sinnewes, by Heat. There are in vse for the Preuention of the Cramp, two Things; The one Rings of Sea-Horse-Teeth, worne vpon the Fingers; The other Bands of Greene Periwinkle (the Herbe) tied about the Calse of the Leg, or the Thigh, &c. where the Crampe vseth to come. I doe finde this the more strange, because Neither of these haue any Relaxing Vertue, but rather the Contrary. I iudge therefore, that their Working is, rather vpon the Spirits, within the Nerves, to make them stricke lesse; Than vpon the Bodily Substance of the Nerves.

965

I would haue Triall made of two other Kindes of Bracelets, for Comforting the Heart, and Spirits; The one of the Trochisch of Vipers, made into little Peeces of Beads; For since they do great Good Inwards (especially for Pestilent Agues) it is like they will be Effectuall Outwards; Where they may be applied in greater Quantity. There wold be Trochisch likewise made

made of *Snakes*; Whose *Flesh* dried, is thought to haue a very *Opening*, and *Cordiall Vertue*. The other is, of *Beads* made of the *Scarlet Powder*, which they call *Kermes*; Which is the Principall *Ingredient* in their *Cordiall Confection Alkermes*: The *Beads* would be made vp with *Amber-Grice*, and some *Pomander*.

It hath beene long receiued, and confirmed by diuers *Trialls*; That the Root of the *Male-Piony*, dried, tied to the *Necke*, doth helpe the *Fal-ling-Sicknesse*; And likewise the *Incubus*, which wee call the *Mare*. The Cause of both these *Diseases*, and especially of the *Epilepsie* from the *Sto-mach*, is the *Grossenesse* of the *Vapours*, which rise and enter into the *Cells* of the *Braine*: And therefore the *Working* is, by *Extreme*, and *Subtill At-tenuation*; Which that *Simple* hath. I iudge the like to be in *Castoreum*, *Muske*, *Rew-Seed*, *Agnus Castus Seed*, &c.

There is a *Stone*, which they call the *Bloud-Stone*, which worne is thought to be good for them that *Bleed* at the *Nose*: Which (no doubt) is, by *Astriction* and *Cooling* of the *Spirits*. *Quare*, if the *Stone* taken out of the *Toads Head*, be not of the like *Vertue*? For the *Toad* loueth *Shade*, and *Coolenesse*.

Light may bee taken from the *Experiment* of the *Horse-Tooth-Ring*, and the *Garland* of *Periwinkle*, how that those things, which asswage the *Strife* of the *Spirits*, doe helpe diseases, contrary to the *Intention* desired: For in the *Curing* of the *Crampe*, the *Intention* is to relax the *Sin-nwes*; But the *Contraction* of the *Spirits*, that they strue lesse, is the best *Helpe*: So to procure easie *Trauails* of *Women*, the *Intension* is to bring downe the *Childe*; But the best *Helpe* is, to stay the *Comming* downe too *Fast*: Whereunto they say, the *Toad-Stone* likewise helpeth. So in *Pes-tilent Feuers*, the *Intention* is to expell the *Infection* by *Sweat*, and *Eua-pouration*; But the best *Meanes* to doe it, is by *Nitre*, *Diascordium*, and o-ther *Cool* Things, which doe for a time arrest the *Expulsion*, till *Nature* can doe it more quietly. For as one saith prettily; In the *Quenching* of the *Flame* of a *Pestilent Ague*, *Nature* is like *People*, that come to quench the *Fire* of a *House*; which are so busie, as one of them letteth another. Surely, it is an *Excellent Axiome*, and of *Manifold Vse*, that whatsoeuer appea-rieth the *Contention* of the *Spirits*, furthereth their *Action*.

The *Writers* of *Naturall Magicke*, commend the *Wearing* of the *Spoile* of a *Snake*, for *Preseruing* of *Health*. I doubt it is but a *Conceit*; For that the *Snake* is thought to renew her *Youth*, by *Casting* her *Spoile*. They might as well take the *Beake* of an *Eagle*, or a *Peece* of a *Harts-Horne*, be-cause those *Renue*.

It hath beene *Anciently Receiued*, (For *Pericles* the *Athenian* vsed it,) and it is yet in *vse*, to weare little *Bladders* of *Quick-Siluer*, or *Tablets* of *Arsenicke*, as *Preseruatiues* against the *Plague*: Not as they conceiue, for any *Comfort* they yeeld to the *Spirits*, but for that being *Poisons* them-selues, they draw the *Venome* to them, from the *Spirits*.

Vide the *Experiments* 95. 96. and 97. touching the *Seuerall Sympa-thies*, and *Antipathies*, for *Medicinall Vse*.

- 972 It is said, that the *Guts* or *Skin* of a *Wolfe* being applied to the *Belly*, doe cure the *Cholicke*. It is true, that the *Wolfe* is a *Beast* of great *Edacity*, and *Disgestion*; And so, it may bee, the *Parts* of him comfort the *Bowels*.
- 973 We see *Scare-Crowes*, are set vp to keepe *Birds* from *Corn*, and *Fruit*; It is reported by some, that the *Head* of a *Wolfe*, whole, dried, and hanged vp in a *Dove-House*, will scare away *Vermine*; Such as are *Weasils*, *Polcats*, and the like. It may be, the *Head* of a *Dog* will doe as much; For those *Vermine* with vs, know *Dogs* better than *Wolues*.
- 974 The *Brains* of some *Creatures* (when their *Heads* are roasted) taken in *Wine*, are said to strengthen the *Memory*: As the *Brains* of *Hares*; *Brains* of *Hens*; *Brains* of *Deeres*, &c. And it seemeth, to bee incident to the *Brains* of those *Creatures*, that are *Fearfull*.
- 975 The *Ointment* that *Witches* vse, is reported to be made, of the *Fat* of *Children*, digged out of their *Graves*; Of the *Juyces* of *Smallage*, *Wolfebane*, and *Cinquefoile*; Mingled with the *Meale* of fine *Wheat*. But I suppose that the *Soporiferous Medicines* are likest to doe it; Which are *Henbane*, *Hemlocke*, *Mandrake*, *Moone-Shade*, *Tobacco*, *Opium*, *Saffron*, *Poplar-Leaves*, &c.
- 976 It is reported by some, that the *Affections* of *Beasts*, when they are in *Strength*, doe adde some *Vertue*, vnto *Inanimate Things*; As that the *Skin* of a *Sheepe*, deuoured by a *Wolfe*, moueth *Itching*; That a *Stone* bitten by a *Dog* in *Anger*, being throwne at him, drunke in *Powder*, prouoketh *Choler*.
- 977 It hath beene obserued, that the *Diet* of *Women* with *Childe*, doth worke much vpon the *Infant*; As if the *Mother* eat *Quinces* much, and *Coriander-Seed* (the *Nature* of both which is to repress and stay *Vapours*, that ascend to the *Braine*) it will make the *Childe* Ingenious: And on the contrary side, if the *Mother* eat (much) *Onions*, or *Beanes*, or such *Vapourous Food*; Or drinke *Wine*, or *Strong Drinke*, immoderately; Or Fast much; Or be giuen to much *Musing*; (All which send, or draw *Vapours* to the *Head*.) It endangereth the *Childe* to become *Lunaticke*, or of *Imperfect Memory*: And I make the same Iudgement of *Tobacco*, often taken by the *Mother*.
- 978 The *Writers* of *Naturall Magicke* report, that the *Heart* of an *Ape*, worne neere the *Heart*, comforteth the *Heart*, and increaseth *Andacity*. It is true, that the *Ape* is a Merry and Bold *Beast*. And that the same *Heart* likewise of an *Ape*, applied to the *Necke*, or *Head*, helpeth the *Wis*; And is good for the *Falling-Sicknesse*: The *Ape* also is a Witty *Beast*, and hath a *Dry Braine*; Which may be some *Cause* of *Attenuation* of *Vapours* in the *Head*. Yet it is said to moue *Dreames* also. It may be, the *Heart* of a *Man* would doe more, but that it is more against *Mens* *Mind*es to vse it; Except it be in such as were the *Reliques* of *Saints*.
- 979 The *Flesh* of a *Hedge-Hog*, Dressed, & Eaten, is said to be a great *Drier*: It is true, that the *Juyce* of a *Hedge-Hog*, must needs be *Harsh* and *Dry*, because it putteth forth so many *Prickles*: For *Plants* also, that are full of *Prickles*,

Prickles, are generally Drie : As *Briars*, *Thornes*, *Berberries* : And therefore the *Ashes* of a *Hedge-Hog* are said to be a great *Desiccative* of *Fistula's*.

Mummy hath great force in *Stanching* of *Bloud* ; which, as it may be ascribed to the *Mixture* of *Balmes*, that are *Glutinous* ; So it may also partake of a *Secret Propriety* ; In that the *Bloud* draweth *Mans Flesh*. And it is approued, that the *Mosse*, which groweth vpon the *Skull* of a *Dead Man*, vnburied, will stanch *Bloud* potently. And so doe the *Dregs*, or *Powder* of *Bloud*, seuered from the *Water*, and *Dried*.

It hath beene practised, to make *White Swallowes*, by *Annointing* of the *Egges* with *Oyle*. Which *Effect* may be produced, by the *Stopping* of the *Pores* of the *Shell*, and making the *Iuyce*, that putteth forth the *Feathers* afterwards, more *Penurious*. And it may be, the *Annointing* of the *Egges*, will be as *Effectuall*, as the *Annointing* of the *Body* ; Of which *Vide* the *Experiment* 93.

It is reported, that the *White* of an *EGGE*, or *Bloud*, mingled with *Salt-Water*, doth gather the *Saltneffe*, and maketh the *Water* sweeter. This may be by *Adhesion* ; As in the 6. *Experiment* of *Clarification* : It may be also, that *Bloud*, and the *White* of an *EGGE*, (which is the *Matter* of a *Living Creature*,) haue some *Sympathy* with *Salt* : For all *Life* hath a *Sympathy* with *Salt*. We see that *Salt*, laid to a *Cut Finger*, healeth it ; So as it seemeth *Salt* draweth *Bloud*, as well as *Bloud* draweth *Salt*.

It hath beene anciently receiued, that the *Sea-Hare*, hath an *Antipathy* with the *Lungs*, (if it commeth neare the *Body*,) and erodeth them. Whereof the *Cause* is conceiued to be, a *Quality* it hath of *Heating* the *Breath*, and *Spirits* ; As *Cantharides* haue vpon the *Watric Parts* of the *Body* ; As *Urine* and *Hydropicall Water*. And it is a good *Rule*, that whatsoever hath an *Operation* vpon certaine *Kindes* of *Matters*, that, in *Mans Bodie*, worketh most vpon those *Parts*, wherein that *Kinde* of *Matter* aboundeth.

Generally, that which is *Dead*, or *Corrupted*, or *Excerned*, hath *Antipathie* with the same *Thing*, when it is *Alive*, and when it is *Sound* ; And with those *Parts* which doe *Excerne* : As a *Carkasse* of *Man* is most *Infectious*, and *Odious* to *Man* ; A *Carriion* of an *Horse* to an *Horse*, &c. *Purulent Matter* of *Wounds*, and *Vlcers*, *Carbuncles*, *Pockes*, *Scabs*, *Leprosie*, to *Sound Flesh* ; And the *Excrement* of euery *Species* to that *Creature* that *Excerneth* them. But the *Excrements* are lesse *Pernicious* than the *Corruptions*.

It is a *Common Experience*, that *Dogs* know the *Dog-Killer* ; When as in times of *Infection*, some *Petty Fellow* is sent out to kill the *Dogs* ; And that, though they haue neuer scene him before, yet they will all come forth, and barke, and fly at him.

The *Relations* touching the *Force* of *Imagination*, and the *Secret Instincts* of *Nature*, are so vncertaine, as they require a great deale of *Examination*, ere we conclude vpon them. I would haue it first thoroughly inquired, whether there be any *Secret Passages* of *Sympathy*, betweene

Persons

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Persons of neare Bloud; As Parents, Children, Brothers, Sisters, Nurse-Children, Husbands, Wives, &c. There be many Reports in *History*, that vpon the *Death* of *Persons* of such Nearenesse, *Men* haue had an inward *Feeling* of it. I my Selfe remember, that being in *Paris*, and my *Father* dying in *London*, two or three dayes before my *Fathers* death, I had a *Dream*, which I told to diuers *Englisb Gentlemen*; That my *Fathers House*, in the *Countrey*, was *Plastered* all ouer with *Blacke Mortar*. There is an *Opinion* abroad, (whether *Idle* or no I cannot say,) That louing and kinde *Husbands*, haue a *Sense* of their *Wives* *Breeding Childe*, by some *Accident* in their owne *Bodie*.

987

Next to those that are *Neare* in *Bloud*, there may be the like *Passage*, and *Instincts* of *Nature*, betweene great *Friends*, and *Enemies*: And sometimes the *Reuealing* is vnto Another *Person*, and not to the *Party* Himselfe. I remember *Philippus Commineus*, (a graue *Writer*,) reporteth; That the *Arch-Bishop* of *Vienna*, (a *Reuerend Prelate*,) said (one day) after *Mass*, to *King Lewis* the eleuenth of *France*; *Sir, your Mortall Enemie is dead*; What time *Duke Charles* of *Burgundy* was *Slaine*, at the *Battell* of *Granson*, against the *Switzers*. Some triall also would be made, whether *Pact* or *Agreement* doe any thing; As if two *Friends* should agree, that such a *Day* in euery *Week*, they being in farre *Distant Places*, should *Pray* one for Another; Or should put on a *Ring*, or *Tablet*, one for anothers *Sake*; Whether if one of them should breake their *Vow* and *Promise*, the other should haue any *Feeling* of it, in *Absence*.

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If there be any *Force* in *Imaginations* and *Affections* of *Singular Persons*; It is Probable the *Force* is much more in the *loynt Imaginations* and *Affections* of *Multitudes*: As if a *Victory* should be won, or lost, in *Remote Parts*, whether is there not some *Sense* thereof, in the *People* whom it concerneth; Becanse of the great *loy*, or *Griefe*, that many *Men* are posselt with, at once? *Pius Quintus*, at the very time, when that *Memorable Victory* was won, by the *Christians*, against the *Turkes*, at the *Nauall Battell* of *Lepanto*, being then hearing of *Causes* in *Consistory*, brake off suddenly, and said to those about him; *It is now more time, we shoul giue thanks to God, for the great Victory he hath granted vs, against the Turkes*. It is true, that *Victory* had a *Sympathy* with his *Spirit*; For it was meereley his *Worke*, to conclude that *League*. It may be, that *Reuelation* was *Diuine*; But what shall we say then, to a Number of *Examples*, amongst the *Grecians*, and *Romans*? Where the *People*, being in *Theaters* at *Playes*, haue had *Newes* of *Victories*, and *Ouerthrowes*, some few dayes, before any *Messenger* could come.

It is true, that that may hold in these Things, which is the generall *Root* of *Superstition*: Namely, that *Men* obserue when *Things Hit*, and not when they *Misse*: And commit to *Memory* the one, And forget and passe ouer the other. But touching *Diuination*, and the *Misgiuing* of *Mindes*, wee shall

shall speake more, when we handle in generall, the Nature of Mindes, and Soules, and Spirits.

We haue giuen formerly some Rules of Imagination; And touching the Fortifying of the Same. We haue set downe also some few Instances, and Directions, of the Force of Imagination, vpon Beasts, Birds, &c. vpon Plants; And vpon Inanimate Bodies: Wherein you must still obserue, that your Trials be vpon Subtill and Light Motions, and not the contrary; For you will sooner, by Imagination, binde a Bird from Singing, than from Eating, or Flying: And I leaue it to euery Man, to choose Experiments, which himselfe thinketh most Commodious; Gining now but a few Examples of euery of the Three Kindes.

Vse some Imaginant, (obseruing the Rules formerly prescribed,) for Binding of a Bird from Singing; And the like of a Dog from Barking. Trie also the Imagination of some, whom you shal accommodate with things to fortifie it, in Cocke-Fights, to make one Cocke more Hardy, and the other more Cowardly. It would be tried also, in Flying of Hawkes; Or in Courting of a Deere, or Hare, with Grey-Hounds; Or in Horse-Races; And the like Comparatiue Motions: For you may sooner by Imagination, quicken or slacke a Motion, than raise or cease it; As it is easier to make a Dog goe slower, than to make him stand still that he may not runne.

In Plants also, you may trie the Force of Imagination, vpon the Lighter Sort of Motions: As vpon the Sudden Fading, or Liuely Comming up of Herbes; Or vpon their Bending one way, or other; Or vpon their Closing, and Opening; &c.

For Inanimate Things, you may trie the Force of Imagination, vpon Staying the Working of Beere, when the Barne is put in; Or vpon the Comming of Butter, or Cheese, after the Cherming, or the Rennes bee put in.

It is an Ancient Tradition, euery where alleaged, for Example of Secres Proprieties and Influences, that the *Torpedo Marina*, if it be touched with a long Sticke, doth stupefie the Hand of him that toucheth it. It is one degree of Working at Distance, to worke by the Continuance of a Fit Medium; As Sound will be conueyed to the Eare, by striking vpon a Bow-String, if the Horne of the Bow be held to the Eare.

The Writers of Naturall Magicke, doe attribute much to the Vertues, that come from the Parts of Liuing Creatures; So as they be taken from them, the Creatures remaining still alive: As if the Creature still liuing did infuse some Immateriall Vertue, and Vigour, into the Part Senered. So much may be true; that any Part, taken from a Liuing Creature, newly slaine, may be of greater force, than if it were taken from the like Creature, dying of it selfe, because it is fuller of Spirit.

Trial would be made, of the like Parts of Individualls, in Plants, and Liuing Creatures; As to cut off a Stocke of a Tree; And to lay that, which you cut off, to Putrefie, to see whether it will Decay the Rest of the Stocke: Or if you should cut off part of the Taile, or Legge of a Dogge,

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or a Cat, and lay it to *Putrife*, and so see whether it will *Fester*, or keepe from *Healing*, the *Part* which remaineth.

It is receiued, that it helpeth to *Continue Love*, if one weare a *Ring*, or a *Bracelet*, of the *Haire* of the *Party Beloued*. But that may be by the *Exciting* of the *Imagination*: And perhaps a *Glove*, or other like *Favour*, may as well doe it.

The *Sympathie* of *Indiuidualls*, that haue beene *Entire*, or haue *Touched*, is of all others the most *Incredible*: Yet according vnto our faithfull *Manner of Examination of Nature*, we will make some little mention of it. The *Taking away* of *Warts*, by *Rubbing* them with Somewhat, that afterwards is put to waste, and consume, is a *Common Experiment*: And I doe apprehend it the rather, because of mine owne *Experience*. I had, from my *Childhood*, a *Wart* vpon one of my *Fingers*: Afterwards when I was about Sixteene Yeares old, being then at *Paris*, there grew vpon both my *Hands* a Number of *Warts*, (at the least an hundred,) in a *Monthes* Space. The *English Embassadors Ladie*, who was a *Woman* farre from *Superstition*, told me, one day; Shee would helpe mee away with my *Warts*: Whereupon shee got a *Peece* of *Lard*, with the *Skin* on, and rubbed the *Warts* all ouer, with the *Fat Side*; And amongst the rest that *Wart*, which I had had from my *Childhood*; Then shee nailed the *Peece* of *Lard*, with the *Fat* towards the *Sunne*, vpon a *Post* of her *Chamber Window*, which was to the *South*. The *Successe* was, that within five weekes space, all the *Warts* went quite away: And that *Wart*, which I had so long endured, for *Company*. But at the rest I did little maruell, because they came in a *Short* time, and might goe away in a *Short* Time againe: But the *Going away* of that, which had staid so long, doth yet sticke with me. They say the like is done, by the *Rubbing* of *Warts* with a *Greene Elder Sticke*, and then *Burying* the *Sticke* to *Rot* in *Mucke*. It would be tried, with *Cornes*, and *Wens*, and such other *Excrescences*. I would haue it also tried, with some *Parts* of *Living Creatures*, that are nearest the *Nature* of *Excrescences*; As the *Combes* of *Cockes*, the *Spurres* of *Cocks*, the *Hornes* of *Beasts*, &c. And I would haue it tried both waies; Both by *Rubbing* those *Parts* with *Lard*, or *Elder*, as before; And by *Cutting off* some *Peece* of those *Parts*, and laying it to *Consume*; To see whether it will *Worke* any *Effect*, towards the *Consumption* of that *Part*, which was once *Joyned* with it.

It is constantly Receiued, and Auouched, that the *Anointing* of the *Weapon*, that maketh the *Wound*, will heale the *Wound* it selfe. In this *Experiment*, vpon the Relation of *Men of Credit*, (though my selfe, as yet, am not fully inclined to beleue it,) you shall note the *Points* following. First, the *Ointment*, wherewith this is done, is made of Diuers *Ingredients*; whereof the Strangest and Hardest to come by, are the *Masse* vpon the *Skull* of a dead *Man*, *Vnburied*; And the *Fats* of a *Boare*, and a *Beare*, killed in the *Act* of *Generation*. These two last I could easily suspect to be prescribed as a *Starting Hole*; That if the *Experiment* proued not, it might be pretended, that the *Beasts* were not killed in the due *Time*;

For

For as for the *Masse*, it is certaine, there is great Quantity of it in *Ireland*, vpon *Slatne Bodies*, laid on *Heapes*, *Vnburied*. The other *Ingredients* are, the *Blond-Stone* in *Powder*, and some other *Things*, which seeme to haue a *Vertue* to *Stanch Blood*; As also the *Masse* hath. And the *Description* of the whole *Ointment* is to be found in the *Chymicall Dispensatory* of *Crollius*. Secondly, the same *Kinde* of *Ointment*, applied to the *Hurt* it selfe, worketh not the *Effect*; but only applied to the *Weapon*. Thirdly, (which I like well) they doe not obserue the *Confecting* of the *Ointment* vnder any certaine *Constellation*; which commonly is the *Excuse* of *Magicall Medicines*, when they faile; that they were not made vnder a fit *Figure* of *Heauen*. Fourthly, it may be applied to the *Weapon*, though the *Party Hurt* be at great *Distance*. Fifthly, it seemeth the *Imagination* of the *Party*, to be *Cured*, is not needfull no *Concurre*; For it may be done, without the *Knowledge*, of the *Partie Wounded*; And thus much hath beene tried, that the *Ointment* (for *Experiments* sake,) hath beene wiped off the *Weapon*, without the *knowledge* of the *Partie Hurt*, and presently the *Party Hurt*, hath beene in great *Rage* of *Paine*, till the *Weapon* was *Reannointed*. Sixthly, it is affirmed, that if you cannot get the *Weapon*, yet if you put an *Instrument* of *Iron*, or *Wood*, resembling the *Weapon*, into the *Wound*, whereby it bleedeth, the *Anointing* of that *Instrument* will serue, and worke the *Effect*. This I doubt should be a *Deuice*, to keepe this strange *Forme* of *Cure*, in *Request*, and *Vse*; Because many times you cannot come by the *Weapon* it selfe. Seuently, the *Wound* must be at first *Washed* cleane, with *White Wine*, or the *Parties owne Water*; And then bound vp close in *Fine Linnen*, and no more *Dressing* renewed, till it be whole. Eightly, the *Sword* it selfe must be *Wrapped* vp *Close*, as farre as the *Ointment* goeth, that it taketh no *Wind*. Ninthly, the *Ointment*, if you wipe it off from the *Sword*, and keepe it, will *Serue* againe; and rather *Increase* in *vertue*, than *Diminish*. Tenthly, it will *Cure* in farre *Shorter Time*, than *Ointments* of *Wounds* commonly doe. Lastly, it will *Cure* a *Beast*, as well as a *Man*; which I like best of all the rest, because it subiecteth the *Matter*, to an *Easie Triall*.

I Would haue *Men* know, that though I reprehend, the *Easie Passing* ouer, of the *Causes* of *Things*, by Ascribing them to *Secret* and *Hidden Vertues*, and *Proprieties*; (For this hath arrested, and laid asleepe, all true *Enquiry*, and *Indications*;) yet I doe not vnderstand, but that in the *Practicall Part* of *Knowledge*, much will be left to *Experience*, and *Probation*, whereunto *Indication* cannot so fully reach: And this not onely in *Specie*, but in *Individuo*. So in *Physicke*, if you will cure the *Iaundies*, it is not enough to say, that the *Medicine* must not be *Cooling*; For that will hinder the *Opening* which the *Disease* requireth: That it must not be *Hot*; For that will exasperate *Choler*: That it must goe to the *Gall*; For there is the *Obstruction* which causeth the *Disease*, &c. But you must receiue from *Experience*, that *Powder* of *Chamapytis*, or the like, drunke in *Beere*, is good for the *Iaundies*: So againe, a wise *Physitian* doth not continue still

Experiment
Solitary, tou-
ching Secret
Proprieties.
999

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FINIS.

NEVV
ATLANTIS.

A VVorke vnfinished.

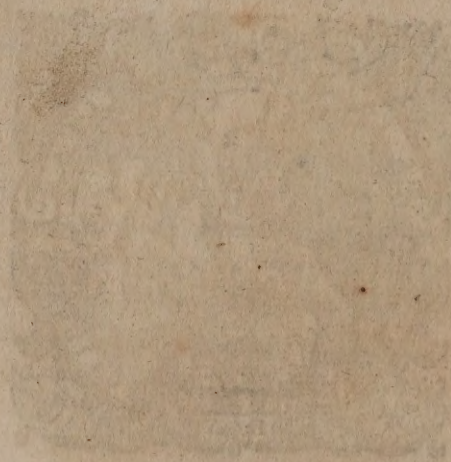
VVritten by the Right Honourable, FRANCIS
Lord Verulam, Viscount St. Alban.



NEW
ATLANTIS.

A VOYAGE & DISCOVERY.

By the Right Honourable, FRANCIS
LOVE, LORD OXFORD, VISCOUNT DE ALBANY.





To the Reader.

His *Fable* my *Lord* deuised, to the end that He might exhibite therein, a *Modell* or *Description* of a *Colledge*, instituted for the *Interpreting* of *Nature*, and the *Producing* of *Great* and *Marueilous Workes* for the *Benefit* of *Men*; Vnder the Name of *Salomons House*, or the *Colledge of the Sixe Dayes Workes*. And euen so farre his *Lordship* hath proceeded, as to finish that Part. Certainly, the *Modell* is more *Vast*, and *High*, then can possibly be imitated in all things; Notwithstanding most Things therein are within *Mens Power* to effect. His *Lordship* thought also in this present *Fable*, to haue composed a *Frame* of *Lawes*, or of the best *State* or *Mould* of a *Common-wealth*; But foreseeing it would be a long *Worke*, his *Desire* of *Collecting* the *Naturall History* diuerted him, which He preferred many degrees before it.

This *Worke* of the *New Atlantis* (as
a 2 much

To the Reader.

much as concerneth the *English Edition*) his Lordship designed for this Place; In regard it hath so neare Affinity (in one Part of it) with the Preceding *Naturall History*.

W: Rawley.

To the Reader.

This Fable my Lord desired, to the
end that He might exhibit there
in, a Modell or Description of a
College, intended for the fur-
thering of Arts, and the Pro-
ducing of Great and Honourable Works for the
Benefit of Mankind; Under the Name of Salomon
House, or the College of the Six Days Works.
And even so hath his Lordship proceeded,
as to build this Part. Certainly, the Modell
more Vast, and High, then can possibly be ima-
ged in all things. Notwithstanding most Things
therein are within Mans Power to effect. His
Lordship thought also in this present Fable, to
have composed a Frame of Letters, out of the best
State or Abbots of a Common wealth. But for
seeing it would be a long Work, his Desire of
Collecting the *Naturall History* directed him,
which He preferred many degrees before it.
This Work of the *Naturall History* (as
much



NEW ATLANTIS



EE sayled from Peru, (wher wee had continued by the space of one whole yeare,) for *China and Iapan*, by the South Sea; taking with vs Victuals for twelue Moneths; And had good Windes from the East, though soft and weake, for fise Moneths space and more. But then the Winde came about, and settled in the West for many dayes, so as we could make little or no way, and were sometimes in purpose to turne back. But then againe ther arose Strong and Great Windes from the South, with a Point East; which carried vs vp, (for all that we could doe) towards the North: By which time our Victualls failed vs, though we had made good spare of them. So that finding our selues, in the Midst of the greatest Wildernesse of Waters in the World, without Victuall, we gaue our Selues for lost Men, and prepared for Death. Yet we did lift vp our Harts and Voices to God aboue, who *sheweth his Wonders in the Deepe*; Beseeching him of his Mercy, that as in the *Beginning* He discovered the *Face of the Deepe*, and brought forth *Dry-Land*; So he would now discover Land to vs, that we mought not perish. And it came to passe, that the next Day about Euening, we saw within a Kenning before vs, towards the North, as it were thick Cloudes, which did put vs in some hope of Land; Knowing how that part of the South Sea was vtterly vnknowne; And might haue Islands, or Continents, that hitherto were not come to light. Wherefore we bent our Course thither, where we saw the Appearance

rance of Land, all that night; And in the Dawning of the next Day, we might plainly discern that it was a Land; Flatt to our sight, and full of Boscage; which made it shew the more Darke. And after an Houre and a halfe Sayling, we entered into a good *Hauen*, being the Port of a faire *Citty*; Not great indeed, but well built, and that gaue a pleasant view from the Sea: And we thinking euery Minute long, till we were on Land, came close to the Shore, and offred to land. But straightwaies we saw diuers of the People, with Bastons in their Hands, (as it were) forbidding vs to land; Yet without any Cries or Fiercenesse, but onely as warning vs off, by Signes that they made. Wherevpon being not a little discomforted, we were aduising with our selues, what we should doe. During which time, ther made forth to vs a small Boate, with about eight Persons in it; wherof One of them had in his Hand a Tipstasse of a yellow Cane, tipped at both ends with Blew, who came aboard our Shipp, without any shew of Distrust at all. And when he saw one of our Number, present himselfe somewhat afore the rest, he drew forth a little Scroule of Parchment, (somewhat yellower then our Parchment: and shining like the Leaues of Writing Tables, but otherwise soft and flexible,) and deliuered it to our foremost Man. In which Scroule were written in Ancient *Hebrew*, and in Ancient *Greeke*, and in good *Latine* of the Schoole, and in *Spanish*, these wordes; *Land yee not, none of you; And provide to be gone, from this Coast, within sixteene daies, except you haue further time giuen you. Meane while, if you want Fresh Water, or Victuall, or helpe for your Sick, or that your Ship needeth repaire, write downe your wants, and you shall haue that, which belongeth to Mercy.* This Scroule was Signed with a Stampe of *Cherubins Wings*, not spred, but hanging downwards; And by them a *Crosse*. This being deliuered, the *Officer* returned, and left onely a Seruant with vs to receyue our Answer. Consulting hereupon amongst our Selues, we were much perplexed. The Deniall of Landing, and Hasty Warning vs away, troubled vs much; On the other side, to finde that the People had Languages, and were so full of Humanity, did comfort vs not a little. And a-
boue

boue all the *Signe* of the *Crosse* to that Instrument, was to vs a great Reioycing, and as it were a certaine Presage of Good. Our Answer was in the *Spanish* tongue; That for our Shipp, it was well; For we had rather mett with Calmes, and contrary Windes, then any Tempests. For our Sick, they were many, and in very ill Case; So that if they were not permitted to Land, they ran danger of their Lives. Our other Wants we sett downe in particular, adding; That we had some little store of Merchandize, which if it pleased them to deale for, it might supply our Wants, without being chargeable vnto them. We offered some Reward in Pistoletts vnto the Seruant, and a peece of Crimson Veluett to be presented to the Officer: But the Seruant tooke them not, nor would scarce looke vpon them; And so left vs, and went back in another little Boate, which was sent for him.

About three Houres after we had dispatched our Answer, ther came towards vs, a Person (as it seemed) of place He had on him a Gowne with wide Sleeues, of a kinde of Water Chamolett, of an excellent Azure Colour, farre more glossy then ours: His vnder Apparell was Green; And so was his Hatt, being in the forme of a Turban, daintely made, and not so huge as the *Turkish* Turbans; And the Lockes of his Haire came downe below the Brimms of it. A Reuerend Man was he to behold. Hee came in a Boate, gilt in some part of it, with foure Persons more onely in that Boate; And was followed by another Boate, wherein were some Twenty. When he was come within a Flight-shott of our Shipp, Signes were made to vs, that we should send forth some to meet him vpon the Water; which we presently did in our Shipp-Boate, sending the principall Man amongst vs saue one, and foure of our Number with him. When we were come within fixe yards of their Boate, they called to vs to stay, and not to approach further; which we did. And ther-vpon the Man, whom I before described, stood vp, and with a loude voice, in *Spanish*, asked; *Are yee Christians?* We answered; *We were*; fearing the lesse, because of the *Crosse* we had seen in the Subscription. At which Answer the said Person lift vp his Right Hand towards Heauen, and drew it softly to

to his Mouth, (which is the Gesture they vse, when they thank God;) And then said: *If yee will sweare, (all of you,) by the Meritts of the SAVIOUR, that yee are no Pirates; Nor haue shed bloud, lawfully, nor unlawfully, within fourtie daies past; you may haue License to come on Land.* Wee said; *Wee were all ready to take that Oath.* Whereupon one of those that were with him, being (as it seemed) a Notary, made an Entry of this Act. Which done, another of the Attendants of the Great Person, which was with him in the same Boate, after his Lord had spoken a little to him, said aloud; *My Lord would haue you know, that it is not of Pride, or Greatnes, that he commeth not aboard your Shipp; But for that, in your Answer, you declare, that you haue many Sick amongst you, he was warned by the Conseruator of Health, of the City, that he should keepe a distance.* We bowed our selues toward him, and answered; *Wee were his humble Seruants; And accounted for great Honour, and singular Humanity towards vs, that which was already done; But hoped well, that the Nature, of the Sicknes, of our Men, was not infectious.* So he returned; And a while after came the Notary to vs aboard our Ship; Holding in his hand a Fruit of that Cuntry, like an Orange, but of colour between Orange-tawney and Scarlet; which cast a most excellent Odour. He vsed it (as it seemeth) for a Preservative against Infection. He gaue vs our Oath; *By the Name of Iesus, and his Merits:* And after told vs, that the next day, by fixe of the Clocke, in the Morning, we should be sent to, and brought to the *Strangers House*, (so he called it,) wher we should be accommodated of things, both for our whole, and for our Sick. So he left vs; And when he offered him some Pistolets, he smiling saide; *He must not be twice paid, for one Labour:* Meaning (as I take it) that he had Salary sufficient of the State for his Seruice. For (as I after learned) they call an Officer that taketh Rewards, *Twice-paid*.

The next Morning early, ther came to vs the same Officer, that came to vs at first with his Cane, and told vs; *He came to conduct vs to the Strangers House; And that hee had prevented the Houre, because we might haue the whole day before vs, for our Businessse.* For (said he) *If you will follow my Advice, ther shall first*

goe with me some few of you, and see the place, and how it may be made
conuenient for you; And then you may send for your Sick, and the rest
of your Number, which yee will bring on Land. We thanked him,
and said; That this Care, which he tooke of desolate Strangers, GOD
would reward. And so sixe of vs went on Land with him:
And when we were on Land, he went before vs, and turned
to vs, and said; He was but our Seruant, and our Guide. Hee ledd
vs through three faire Streets; And all the way we went, ther
were gathered some People on both sides, standing in a Row;
But in so ciuill a fashion, as if it had beene, not to wonder at
vs, but to welcome vs: And diuers of them, as we passed by
them, put their Armes a little abroad; which is their Gesture,
when they bid any welcome. The Strangers House is a faire
and spacious House, built of Brick, of somewhat a blew
Colour then our Brick; And with handsome windowes,
some of Glasse, some of a kinde of Cambrick oyl'd. He
brought vs first into a faire Parlour aboue staires, and then
asked vs, What number of Persons we were? And how many sick?
We answered, We were in all, (sick and whole,) one and fifty Per-
sons, whereof our sick were seuentene. He desired vs to haue pa-
tience a little, and to stay till he came back to vs; which was
about an Houre after; And then hee led vs to see the Cham-
bers, which were provided for vs, being in number nineteene.
They hauing cast it (as it seemeth) that foure of those Cham-
bers, which were better then the rest, might receiue foure of
the principall Men of our Company; And lodge them alone
by themselues; And the other 15. Chambers were to lodge
vs two and two together. The Chambers were handsome
and cheerefull Chambers. and furnished ciuilly. Then he
ledd vs to a long Gallery, like a Dorture, where hee shewed
vs all along the one side (for the other side was but wall and
window,) seuenteen Cells, very neat ones, hauing partitions
of Cedar wood. which Gallery, and Cells, being in all four-
ty, (many more then we needed,) were instituted as an Infir-
mary for sick Persons. And he told vs withall, that as any of
our Sick waxed well, he might be remoued from his Cell, to
a Chamber: For which purpose, there were sett forth ten

spare Chambers, besides the Number we spake of before. This done, he brought vs back to the Parlour, and lifting vp his Cane a little, (as they doe when they giue any Charge or Commaund) said to vs; *Yee are to know, that the Custome of the Land requireth, that after this day, and too morrow, (which we giue you for remoouing of your people from your Shipp,) you are to keepe within dores for three daies. But lett it not trouble you, nor doe not think your selues restrained, but rather left to your Rest and Ease. You shall want nothing, and there are sixe of our People appointed to attend you, for any Busines you may haue abroad. VVee gaue him thanks, with all Affection and Respect, and said; GOD surely is manifested in this Land. VVee offred him also twenty Pisto-
 letts; But he smiled, and onely saide; What? twice paid! And so he left vs. Soone after our Dinner was serued in; Which was right good Viands, both for Bread, and Meate: Better then any Collegiate Diett, that I haue knowne in Europe. VVe had also Drinke of three sorts, all wholesome and goode; Wine of the Grape; A Drink of Graine, such as is with vs our Ale, but more cleare: And a kinde of Sider made of a Fruit of that Cuntry; A wonderfull pleasing and Refreshing Drink. Be-
 sides, ther were brought in to vs, great store of those Scarlett Orenge, for our Sick; which (they said) were an assured Re-
 medy for sicknes taken at Sea. Ther was giuen vs also, a Boxe of small gray, or whitish Pills, which they wished our Sicke should take, one of the Pills, euery night before sleepe, which (they said) would hasten their Recouery. The next day, after that our Trouble of Cariage, & Remouing of our Men, and Goods, out of our Shipp, was somewhat settled and quiett, I thought good to call our Company together, and when they were assembled, said vnto them; *My deare Friends; Let vs know our selues, and how it standeth with vs. We are Men cast on Land, as Ionas was, out of the Whales Belly, when we were as buried in the Deepe: And now we are on Land, wee are but between Death and Life; For we are beyond, both the Old World, and the New; And whe-
 ther euer wee shall see Europe, GOD onely knoweth. It is a kinde of Miracle hath brought vs hither: And it must bee little lesse, that shall bring vs hence. Therefore in regard of our Deliuerance past, and*
 our*

our danger present, and to come, let vs looke vp to GOD, and euery man reforme his owne wayes. Besides wee are come here amongst a Christian People, full of Piety and Humanity: Let vs not bring that Confusion of face vpon our selues, as to shew our vices, or unworthinesse before them. Yet there is more. For they haue by Commandement, (though in forme of Courtesie) Cloistered vs within these Walls, for three dayes: Who knoweth, whether it be not, to take some tast of our manners and conditions? And if they finde them bad, to banish vs streight-wayes; If good, to giue vs further time. For these Men, that they haue giuen vs for Attendance, may withall haue an eye vpon vs. Therefore for GODS loue, and as we loue the weale of our Soules and Bodies, let vs so behaue our selues, as wee may be at peace with GOD, and may finde grace in the Eyes of this People. Our Company with one voice thanked me for my good Admonition, and promised me to liue soberly and ciuilly, and without giuing any the least occasion of Offence. So we spent our three dayes ioyfully, and without care, in expectation what would be done with vs, when they were expired. During which time, we had euery houre ioy of the Amendment of our Sick; who thought themselues cast into some Diuine Poole of Healing; They mended so kindely, and so fast.

The Morrow after our three dayes were past, ther came to vs a new Man, that we had not seen before, clothed in Blew as the former was, saue that his Turban was white with a small red Crosse on the Topp. He had also a Tippet of fine Linnen. At his Comming in, he did bend to vs a little, and put his Armes abroad. Wee of our parts saluted him in a very lowly and submissiue manner; As looking that from him, wee should receyue Sentence of Life, or Death. He desired to speak with some few of vs: Wherupon sixe of vs onely staid, and the rest auoyded the Roome. He said; I am by Office Gouerner of this House of Strangers, and by Vocation I am a Christian Priest; And therefore am come to you, to offer you my seruice, both as Strangers, and chiefly as Christians. Some things I may tell you, which I thinke you will not be vnwilling to heare. The State hath giuen you Licence to stay on Land, for the space of sixe weekes: And let it not trouble you, if your occasions aske further time, for the Law in

this point is not precise; And I doe not doubt, but my selfe shall be able, to obtaine for you, such further time, as may be conuenient. Yee shall also vnderstand, that the Strangers House, is at this time Rich, and much aforehand; For it hath layd vpon Reuenew these 37. yeares: For so long it is, since any Stranger arrived in this part: And therefore take yee no care; The State will defray you all the time you stay: Neither shall you stay one day the lesse for that. As for any Merchandize yee haue brought, yee shall be well vsed, and haue your returne, either in Merchandize, or in Gold and Siluer: For to vs it is all one. And if you haue any other Request to make, hide it not. For yee shall finde, we will not make your Countenance to fall, by the Answer ye shall receiue. Onely this I must tell you, that none of you must goe aboue a Karan, (that is with them a Mile and an halfe) from the walles of the Citty, without especiall leaue. We answered, after we had looked awhile one vpon an other, admiring this gracious and parent-like vsage; That we could not tell what to say: For we wanted words to expresse our Thanks; And his Noble free Offers left vs nothing to aske. It seemed to vs, that we had before vs a picture of our Saluation in Heauen: For wee that were a while since in the Iawes of Death, were now brought into a place, where we found nothing but Consolations. For the Commandement laid vpon vs, we would not faile to obey it, though it was impossible, but our Hearts should be enflamed to tread further vpon this Happy and Holy Ground. Wee added; That our Tongues should first cleaue to the Roofes of our Mouthes, ere we should forget, either his Reuerend Person, or this whole Nation, in our Prayers. Wee also most humbly besought him, to accept of vs as his true seruants, by as iust a Right, as euer Men on Earth were bounden, laying and presenting, both our Persons, and all we had, at his feete. He saide; He was a Priest, and looked for a Priests reward, which was our Brotherly loue, and the Good of our Soules and Bodies. So he went from vs, not without teares of Tenderneffe in his Eyes; And left vs also confused with loy and Kindnesse, saying amongst our selues; That wee were come into a Land of Angells, which did appeare to vs dayly, and preuent vs with Comforts, which we thought not of, much lesse expected.

The next day about 10. of the Clocke, the Gouvernour came

came to vs againe, and after Salutations, said familiarly; *That he was come to visit vs; And called for a Chaire, and satt him downe; And we being some 10. of vs, (the rest were of the meaner sort, or else gone abroad,) sate down with him. And when we were sett, he began thus. Wee of this Island of Bensalem (for so they call it in their Language) haue this; That by meanes of our solitary Situation; and of the Lawes of Secrecy, which we haue for our Trauellers: and our rare Admission of Strangers; we know well most part of the Habitable World, and are our selues unknowne. Therefore because he that knoweth least, is fittest to aske Questions, it is more Reason, for the Entertainment of the time, that yee aske mee Questions, then that I aske you. Wee answered; That wee humbly thanked him, that hee would giue vs leave so to doe: And that wee conceiued by the tast wee had already, that ther was no worldly thing on Earth, more worthy to bee knowne, then the State of that happy Land. But aboue all (wee said) since that wee were mett from the seuerall Ends of the world; and hoped assuredly, that wee should meete one day in the Kingdome of Heauen (for that wee were both parts Christians) wee desired to know (in respect that Land was so remote, and so diuided by vast and unknowne Seas, from the Land, wher our SAVIOUR walked on Earth) who was the Apostle of that Nation, and how it was conuerted to the faith? It appeared in his face, that he tooke great Contentment in this our Question: He said, Yee knit my Heart to you, by asking this Question in the first place; For it sheweth that you First seeke the Kingdome of Heauen; And I shall gladly, and briefly, satisfie your demaund.*

About twenty Yeares after the Ascension of our SAVIOUR, it came to passe, that ther was seen by the people of Rensula, (a Citty vpon the Easterne Coast of our Island,) within Night, (the Night was Cloudy and Calme,) as it might be some mile into the Sea, a great Pillar of Light; Not sharp, but in forme of a Columne, or Cylinder, rising from the Sea, a great way vp towards Heauen; and on the topp of it was seene a large Crosse of Light, more bright and resplendent then the Body of the Pillar. Vpon which so strange a Spectacle, the People of the Citty gathered apace together vpon the Sands, to wonder; And so after put themselues into a number of small Boates, to goe

nearer to this Marueilous sight. But when the Boates were come within (about) 60. yeards of the Pillar, they found themselves all bound, and could goe no further; yet so as they might moue to goe about, but might not approach nearer: So as the Boates stood all as in a Theater, beholding this Light, as an Heauenly Signe. It so fell out, that ther was in one of the Boates, one of the Wise Men, of the Society of Salomons House; which House, or Colledge (my good Brethren) is the very Eye of this Kingdome; Who hauing a while attentively and deuoutly viewed, and contemplated this Pillar, and Crosse, fell downe vpon his face; And then raysed himselfe vpon his knees, and lifting vp his Hands to Heauen, made his prayers in this manner.

Lord God of Heauen and Earth; thou hast vouchsafed of thy Grace, to those of our Order, to know thy Workes of Creation, and the Secrets of them; And to discern (as farre as appertaineth to the Generations of Men) Between Diuine Miracles, Works of Nature, Workes of Art, and Impostures and Illusions of all sorts. I doe here acknowledge and testifie before this People, that the Thing which we now see before our eyes, is thy Finger, and a true Miracle. And for-as-much, as we learne in our Bookes, that thou neuer workest Miracles, but to a Diuine and Excellent End, (for the Lawes of Nature are thine owne Lawes, and thou exceedest them not but vpon great cause) wee most humbly beseech thee, to prosper this great Signe; And to giue vs the Interpretation and vse of it in Mercy; Which thou dost in some part secretly promise, by sending it vnto vs.

When he had made his Prayer, hee presently found the Boate he was in, moueable and vnbound; where as all the rest remained still fast; And taking that for an assurance of Leauē to approach, he caused the Boate

Boate to be softly, and with silence, rowed towards the Pillar. But ere he came neere it, the Pillar and Crosse of Light brake up, and cast it selfe abroad, as it were, into a Firmament of many Starres; which also vanished soone after, and ther was nothing left to be seen, but a small Arke, or Chest of Cedar, dry, and not wett at all with water, though it swam. And in the Fore-end of it, which was towards him, grew a small Greene Branch of Palme; And when the wise Man had taken it, with all reuerence, into his Boate, it opened of it selfe, and ther were found in it, a Booke, and a Letter, Both written in fine Parchment, and wrapped in Sindons of Linnen. The Booke contained all the Canonickall Bookes of the Old and New Testament, according as you haue them; (For we know well what the Churches with you receiue;) And the Apocalypse it selfe; And some other Bookes of the New Testament, which were not at that time written, were neuerthelesse in the Book. And for the Letter, it was in these words.

I Bartholomew, a Seruant of the Highest, and Apostle of IESVS CHRIST, was warned by an Angell, that appeared to me, in a vision of Glory, that I should commit this Arke to the flouds of the Sea. Therefore, I doe testifie and declare, vnto that People, where GOD shall ordaine this Arke to come to Land, that in the same day, is come vnto them Salvation and Peace, and Good Will, from the Father, and from the LORD IESVS.

There was also in both these writings, as well the Booke, as the Letter, wrought a great Miracle, Conforme to that of the Apostles, in the Originall Gift of Tongues. For there being at that time, in this Land, Hebrewes, Persians, and Indians, besides the Natiues, euery one redd vpon the Booke, and Letter, as if they had been written in his owne Language. And thus was this Land saued from Infidelity, (as the Remaine of the Old World was from Water) by an Ark, through the Apostolicall & Miraculous Euangelisme of Saint Bartholomew. And here hee paused, and a Messenger came, and

and called him from vs. So this was all that passed in that Conference.

The next Day, the same Gouvernor came againe to vs, immediately after Dinner, and excused himselfe, laying; That the Day before, he was called from vs, somewhat abruptly, but now he would make vs amends, and spend time with vs; if we held his Company, and Conference agreeable. Wee answered; That wee held it so agreeable and pleasing to vs, as wee forgot both Dangers past, and Feares to come, for the time wee heard him speake; And that wee thought an Houre spent with him, was worth Yeares of our former life. He bowed himselfe a little to vs, and after we were set againe, he saide; Well, the Questions are on your part. One of our Number said after a little Pause; That there was a Matter, wee were no lesse desirous to know, then fearefull to aske, least wee might presume too farre. But encouraged by his rare Humanity towards vs, (that could scarce thinke our selves Strangers, being his vowed and professed Servants,) we would take the Hardines to propound it: Humbly beseeching him, if hee thought it not fit to bee answered, that hee would pardon it, though hee reiected it. Wee said; Wee well observed those his words, which hee formerly spake, that this happy Island, where we now stood, was knowne to few, and yet knew most of the Nations of the World; which we found to be true, considering they had the Languages of Europe, and knew much of our State and Business; And yet we in Europe, (notwithstanding all the remote Discoveries, and Navigations of this last Age) neuer heard any of the least Inkling or Glimse of this Island. This we found wonderfull strange; For that all Nations haue Enterknowledge one of another, either by Voyage into Forraigne Parts, or by Strangers that come to them. And though the Trauailer into a Forreine Countrey, doth commonly know more by the Eye, then he that stayeth at home can by relation of the Trauailer; Yet both wayes suffice to make a mutuall Knowledge, in some degree, on both parts. But for this Island, wee neuer heard tell of any Shipp of theirs, that had been seene to arrive vpon any shore of Europe; No, nor of either the East or West Indies, nor yet of any Shipp of any other part of the World, that had made returne from them. And yet the Maruell rested not in this. For the Situation of it (as his Lordship said,) in the secret Conclauce of such a vast Sea

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mought cause it. But then, that they should haue Knowledge of the Languages, Bookes, Affaires, of those that lye such a distance from them, it was a thing wee could not tell what to make of; For that it seemed to vs a condition and Propriety of Diuine Powers and Beings, to bee hidden and vnseene to others, and yet to haue others open, and as in a light to them. At this speech the Gouvernour gaue a gracious smile, and sayd; That we did well to aske pardon for this Question we now asked; For that it imported, as if we thought this Land, a Land of Magicians, that sent forth Spirits of the Ayre into all parts, to bring them Newes and Intelligence of other Countries. It was answered by vs all, in all possible humblenes, but yet with a Countenance taking knowledge, that wee knew that he spake it but merrily; That we were apt enough to think, ther was somewhat supernaturall in this Island, but yet rather as Angelicall then Magicall. But to let his Lordship know truly, what it was, that made vs tender and doubtful to aske this Question, it was not any such conceit, but because wee remembred, he had giuen a Touch in his former Speech, that this Land had Lawes of Secrecy touching Strangers. To this he said, You remember it aright: And therefore in that I shall say to you, I must reserue some particulars, which it is not lawfull for mee to reueale; but there will bee enough left, to giue you satisfaction.

You shall vnderstand (that which perhaps you will scarce think credible) that about three thousand Yeares agoe, or somewhat more, the Nauigation of the World (specially for remote Voyages) was greater then at this Day. Doe not thinke with your selues, that I know not how much it is encreased with you, within these sixe score Yeares: I know it well; And yet I say, greater then, than now: Whether it was, that the Example of the Ark, that saued the Remnant of Men, from the vniuersall Deluge, gaue Men confidence to aduenture vpon the Waters; Or what it was; but such is the Truth. The Phoenicians, and specially the Tyrians, had great Fleetes. So had the Carthaginians their Colony, which is yet further West. Toward the East the Shipping of Egypt, and of Palestina was likewise great. China also, and the great Atlantis, (that you call America) which haue now but Iunks, and Canoa's, abounded then in tall Ships. This Island, (as appeareth by faithfull Registers of those times) had then fiftene
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hundred strong Ships, of great content. Of all this, there is with you sparing Memory, or none; But we haue large Knowledge thereof.

At that time, this Land was knowne and frequented by the Ships and Vessells of all the Nations before named. And (as it commeth to passe) they had many times Men of other Countries, that were no Saylers, that came with them; As Persians, Chaldeans, Arabians; So as almost all Nations of Might and Fame resorted hither; Of whom we haue some Stirps, and little Tribes with vs, at this day. And for our owne Ships, they went sundry Voyages; as well to your Streights, which you call the Pillars of Hercules, As to other parts in the Atlantique and Mediterrane Seas; As to Paguin, (which is the same with Cambaline) and Quinzy, upon the Orientall Seas, as farre as to the Borders of the East Tartary.

At the same time, and an Age after, or more, the Inhabitants of the great Atlantis did flourish. For though the Narration and Description, which is made by a great Man with you; that the Descendents of Neptune planted there; and of the Magnificent Temple, Pallace, Citie, and Hill; And the manifold streames of goodly Nauigable Riuer, (which as so many Chaines enuironed the same Site, and Temple;) And the seuerall Degrees of Ascent, wherby Men did climb vp to the same, as if it had bin a Scala Cæli; be all Poeticall and Fabulous: Yet so much is true, that the said Country of Atlantis; As well that of Peru then called Coya, as that of Mexico then named Tyrambel, were mighty and proud Kingdomes, in Armes, Shipping, and Riches: So Mighty, as at one time, (or at least within the space of 10. Yeares,) they both made two great Expeditions; They of Tirambel through the Atlantique to the Mediterrane Sea; and they of Coya through the South Sea upon this our Island: And for the former of these, which was into Europe, the same Authour amongst you, (as it seemeth,) had some relation from the Egyptian Priest, whom he citeth For assuredly such a thing ther was. But whether it were the Ancient Athenians, that had the glory of the Repulse, and Resistance of those Forces, I can say nothing: But certaine it is, there neuer came backe, either Ship, or Man, from that Voyage. Neither had the other Voyage of those of Coya upon vs, had better fortune, if they had not met with Enemies of greater clemency. For the King of this Island, (by name Altabin,) a wise Man, and a great Warrior;

Warrier; Knowing well both his owne strength, and that of his Enemies; handled the matter so, as he cut off their Land-Forces, from their Ships; and entoyled both their Nauy, and their Campe, with a greater Power then theirs, both by Sea and Land: And compelled them to render themselues without striking stroke: And after they were at his Mercy, contenting himselfe onely with their Oath, that they should no more beare Armes against him, dismissed them all in safety. But the Diuine Reuenge, ouertooke not long after those proud Enterprises. For within lesse then the space of one Hundred Yeares, the Great Atlantis was utterly lost and destroyed: Not by a great Earthquake, as your Man saith; (For that whole Tract is little subiect to Earthquakes;) But by a particular Deluge or Inundation; Those Countries hauing, at this Day, farr greater Riuers, and farr higher Mountaines, to poure downe waters, then any part of the Old World. But it is true, that the same Inundation was not deepe; Not past forty foote, in most places, from the Ground; So that, although it destroyed Man and Beast generally, yet some few wild Inhabitants of the Wood escaped. Birds also were saued by flying to the high Trees and Woods. For as for Men, although they had Buildings in many places, higher then the Depth of the Water; Yet that Inundation, though it were shallow, had a long Continuance; whereby they of the Vale, that were not drowned, perished for want of Food, and other things necessary. So as maruaile you not at the thin Population of America, nor at the Rudenesse and Ignorance of the People; For you must account your Inhabitants of America as a young People; Younger a thousand yeares, at the least, then the rest of the World. For that there was so much time, betweene the Vniuersall Floud, and their Particular Inundation. For the poore Remnant of Humane Seed, which remained in their Mountaines, Peopled the Countrey againe slowly, by little and little; And being simple and sauage People, (Not like Noah and his Sonnes, which was the chiefe Family of the Earth) they were not able to leaue Letters, Arts, and Ciuillity, to their Posterity; And hauing likewise in their Montanous Habitations beene used, (in respect of the extreame Cold of those Regions,) to cloath themselues with the Skinns of Tygers, Beares, and great Hairy Goates, that they haue in those Parts; When after they came downe into the Valley, and found the

Intollerable Heates which are there, and knew no meanes of lighter Apparell; they were forced to beginn the Custome of Going Naked, which continueth at this day. Onely they take great pride and delight, in the Feathers of Birds; And this also they tooke from those their Ancestours of the Mountaines, who were invited vnto it, by the infinite Flights of Birdes, that came vnto the high Grounds, while the Waters stood below. So you see, by this maine Accident of Time, wee lost our Traffique with the Americans, with whom, of all others, in regard they lay nearest to vs, wee had most Commerce. As for the other Parts of the World, it is most manifest, that in the Ages following, (whether it were in respect of Warres, or by a naturall Resolution of Time,) Navigation did euery wher greatly decay; And specially, farre Voyages, (therather by the vse of Gallies, and such Vessells as could hardly brooke the Ocean,) were altogether lft and omitted. So then, that part of Entercourse, which could bee from other Nations, to Sayle to vs, you see how it hath long since ceased; Except it were by some rare Accident, as this of yours. But now of the Cessation of that other Part of Entercourse, which mought be by our Sayling to other Nations, I must yeeld you some other Cause. For I cannot say, (if I shall say truly,) but our Shipping, for Number, Strength, Marriners, Pylots, and all things that appertaine to Navigation, is as great as euer; And therefore why we should sit at home, I shall now giue you an account by it selfe; And it will draw nearer, to giue you satisfaction, to your principall Question.

There raigned in this Island, about 1900. yeares agoe, a King, whose memory of all others we most adore; Not Superstitiously, but as a Diuine Iustrument, though a Mortall Man: His Name was Solamona. And we esteeme him as the Law-giuer of our Nation. This King had a large heart, inscrutable for good; And was wholly bent to make his Kingdome and People Happy. He therefore taking into Consideration, how sufficient and substantiue this Land was, to maintaine it selfe, without any and (at all) of the Forrainer; Being 5600. Miles in circuit, and of rare Fertility of Soyle, in the greatest part thereof; And finding also the Shipping of this Country mought bee plentifully set on worke, both by Fishing, and by Transportations from Port to Port, and likewise by Sayling

Unto some small Islands that are not farre from vs, and are under the Crowne and Lawes of this State; And recalling into his Memory, the happy and flourishing Estate, wherein this Land then was; So as it mought bee a thousand wayes altered to the worse, but scarce any one way to the better; thought nothing wanted to his Noble and Heroicall Intentions, but onely (as farr as Humane foresight mought reach) to giue perpetuitie to that, which was in his time so happily established. Therefore amongst his other Fundamentall Lawes of this Kingdome, he did ordaine the Interdicts and Prohibitions, which wee haue touching Entrance of Strangers; which at that time (though it was after the Calamity of America) was frequent; Doubting Nouelties, and Commixture of Manners. It is true, the like Law, against the Admission of Strangers without License, is an Ancient Law, in the Kingdome of China, and yet continued in use. But ther it is a poore Thing; And hath made them a curious, ignorant, fearefull, foolish Nation. But our Law-giuer made his Law of another temper. For first, hee hath preserved all points of Humanity, in taking Order, and making Prouision for the Reliefe of Strangers distressed; whereof you haue tasted. At which Speech (as reason was) wee all rose vp, and bowed our selues. Hee went on. That King also still desiring to ioyne Humanity and Pollicy together; And thinking it against Humanity, to detaine Strangers here against their wills; And against Pollicy, that they should returne, and discover their Knowledge of this Estate, he tooke this Course: He did ordaine, that of the Strangers, that should be permitted to Land, as many (at all times) mought depart as would; But as many as would stay, should haue very good Conditions, and Meanes to liue, from the State. Wherein hee saw so farre, that now in so many Ages since the Prohibition, wee haue memory not of one Shipp that euer returned, and but of thirteene Persons only, at seuerall times, that chose to returne in our Botomes. What those few that returned may haue reported abroad I know not. But you must thinke, Whatsoever they haue said, could bee taken where they came, but for a Dreame. Now for our Trauelling from hence into Parts abroad, our Law-giuer thought fit altogether to restraints it. So is it not in China. For the Chineses sayle where they will, or can; which sheweth, that

their Law of Keeping out Strangers, is a Law of Pusillanimity, and feare. But this restraint of ours, hath one onely Exception, which is admirable; Preseruing the good which commeth by communicating with Strangers, and auoyding the Hurt; And I will now open it to you. And here I shall seeme a little to digresse, but you will by and by finde it pertinent. Yee shall vnderstand, (my deare Friends,) that amongst the Excellent Acts of that King, one aboue all hath the prebeminence. It was the Erektion, and Institution of an Order, or Society, which wee call Salomons House; The Noblest Foundation, (as wee thinke,) that euer was vpon the Earth, And the Lantberne of this Kingdome. It is dedicated to the Study of the Works, and Creatures of GOD. Some thinke it beareth the Founders Name a little corrupted, as if it should be Solamona's House. But the Records write it, as it is spoken. So as Itake it to bee denominate of the King of the Hebrewes, which is famous with you, and no Stranger to vs. For wee haue some Parts of his workes, which with you are lost; Namely that Naturall History, which he wrote of all Plants, from the Cedar of Libanus, to the Mosse that groweth out of the wall; And of all things that haue Life and Motion. This maketh me thinke, that our King finding himselfe to Symbolize, in many things, with that King of the Hebrewes (which liued many yeares before him) honoured him with the Title of this Foundation. And I am the rather induced to be of this Opinion, for that I finde in ancient Records, this Order or Societic is sometimes called Salomons House; And sometimes the Colledge of the sixe Daies Workes: wherby I am satisfied, That our Excellent King had learned from the Hebrewes; That GOD had created the World, and all that therein is, within sixe Dayes; And therefore hee instituting that House, for the finding out of the true Nature of all Things, (whereby GOD mought haue the more Glory in the Workemanship of them, and Men the more fruit in the use of them,) did giue it also that second Name. But now to come to our present purpose. When the King had forbidden, to all his People, Nauigation into any Part, that was not vnder his Crowne, he made neuerthelesse this Ordinance; That euery twelue yeares ther should be set forth, out of this Kingdome, two Shipps; appointed to seuerall Voyages; That in either of these Shipps,

Shipp, ther should be a Mission of three of the Fellowes, or Brethren of Salomons House; whose Errand was onely to giue vs Knowledge of the Affaires and State of those Countries, to which they were designed; And especially of the Sciences, Arts, Manufactures, and Inuentions of all the World; And withall to bring vnto vs, Bookes, Instruments, and Patternes, in euery kinde: That the Ships, after they had landed the Brethren, should returne; And that the Brethren should stay abroad till the new Mission. These Ships are not otherwise fraught, then with Store of Victualls, and good Quantitie of Treasure to remaine with the Brethren, for the buying of such Things, and rewarding of such Persons, as they should thinke fit. Now for me to tell you, how the Vulgar sort of Marriners are contained from being discovered at Land; And how they that must be put on shore for any time, colour themselues vnder the Names of other Nations; And to what places these Voyages haue beene designed; And what places of Rendez-Vous are appointed for the new Missions; And the like Circumstances of the Practique; I may not doe it; Neither is it much to your desire. But thus you see, wee maintaine a Trade, not for Gold, Siluer, or Iewels; Nor for Silkes; Nor for Spices; Nor any other Commodity of Matter; But onely for GODS first Creature, which was Light: To haue Light (I say) of the Growth of all Parts of the World. And when hee had said this, he was silent; And so were wee all. For indeed wee were all astonished, to heare so strange things so probably told. And hee perceiuing, that wee were willing to say somewhat, but had it not ready, in great Courtesie tooke vs off, and descended to aske vs Questions of our Voyage and Fortunes, and in the end concluded, that wee mought doe well, to thinke with our selues, what Time of stay wee would demand of the State; And bad vs not to scant our selues; For he would procure such time as wee desired. Wherevpon wee all rose vp, and presented our selues to kisse the skirt of his Tippet; But hee would not suffer vs; and so tooke his leaue. But when it came once amongst our People, that the State vsed to offer Conditions to Strangers, that would stay, wee had Worke enough to get any of our Men to looke to our Shipp; And

to keepe them from going presently to the Gouvernour, to craue Conditions. But with much adoe wee refrained them, till we mought agree what Course to take.

We took our selues now for free men, seeing ther was no danger of our vtter Perdition, And liued most ioyfully, going abroad, and seeing what was to be seen, in the Citty, and places adiacent, within our *Tedder*; And obtaining Acquaintance with many of the Citty, not of the meanest Quallity; At whose hands we found such Humanity, and such a Freedome and desire, to take Strangers, as it were, into their Bosome, as was enough to make vs forget all that was deare to vs, in our owne Countries: And continually we mett with many things, right worthy of Obseruation, & Relation: As indeed, if ther be a Mirrour in the World, worthy to hold Mens Eyes, it is that Countrey. One day there were two of our Company bidden to a *Feast* of the *Family*, as they call it. A most Naturall, Pious, & Reuerend Custome it is, shewing that Nation to be compounded of all Goodnes. This is the manner of it. It is granted to any Man, that shall liue to see thirty Persons, descended of his Body, aliue together, and all about 3. yeares old, to make this *Feast*, which is done at the Cost of the State. The *Father* of the *Family*, whom they call the *Tirsan*, two dayes before the *Feast*, taketh to him three of such Friends as he liketh to chuse; And is assisted also by the Gouvernour of the Citty, or Place, where the *Feast* is celebrated; And all the *Persons* of the *Family*, of both Sexes, are summoned to attend him. These two dayes the *Tirsan* sitteth in Consultation, concerning the good Estate of the *Family*. Ther, if ther be any Discord or sutes betweene any of the *Family*, they are compounded and appeased. Ther, if any of the *Family* bee Distressed or Decayed, order is taken for their Reliefe, and competent meanes to liue. Ther, if any bee subiect to vice, or take ill Courses, they are reprovued and Censured. So likewise, Direction is giuen touching Mariages, and the Courses of life, which any of them should take, with diuers other the like Orders and Aduises. The Gouvernour assisteth, to the end, to put in Execution, by his
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Publicke Authority, the Decrees and Orders of the *Tirfan*, if they should bee disobeyed; Though that feldome needeth; Such Reuerence and Obedience they giue, to the Order of Nature. The *Tirfan* doth also then, euer chuse one Man from amongst his Sonnes, to liue in House with him: Who is called, euer after, the *Sonne of the Vine*. The Reason will hereafter appeare. On the *Feast* day, the *Father* or *Tirfan* commeth foorth after Diuine Seruice, into a large Roome, where the *Feast* is celebrated; Which Roome hath an Halfe-Pace at the vpper end. Against the wall, in the middle of the halfe-pace, is a Chaire placed for him, with a Table and Carpet before it.ouer the Chaire is a State, made Round or Ouall, and it is of Iuy; An Iuy somewhat whiter then ours, like the Leafe of a Siluer Aspe, but more shining; For it is greene all winter. And the State is curiously wrought with Siluer and Silke of diuers Colours, broyding or binding in the Iuy; And is euer of the worke, of some of the Daughters of the Family; And vailed ouer at the Topp, with a fine Nett of Silke and Siluer. But the Substance of it, is true Iuy; wherof, after it is taken downe, the Friends of the Family, are desirous to haue some Leafe or Sprigg to keepe. The *Tirfan* commeth forth with all his Generation or Linage, the Males before him, and the Females following him; And if there be a Mother, from whose Body the whole Linage is descended, there is a Trauerse placed in a Loft aboue, on the right hand of the Chaire, with a priuy Dore, and a carued Window of Glasse, leaded with Gold and blew; Wher shee sitteth, but is not seene. When the *Tirfan* is come foorth, he sitteth downe in the Chaire; And all the Linage place themselues against the wall, both at his back, and vpon the Returne of the Halfe-pace, in Order of their yeares, without difference of Sexe, and stand vpon their Feete. When hee is sett, the Roome being alwaies full of Company; but well kept and without Disorder, after some paule, there commeth in from the lower end of the Roome, a *Taratan*, (which is as much as an *Herald*;))

And on either side of him two young *Lads*; Wherof one carrieth a Scrowle of their shining yellow Parchment; And the other a Cluster of Grapes of Gold, with a long Foote or Stalke. The *Herald*, and *Children*, are cloathed with Mantles of Sea-water greene Sattin; But the *Herals* Mantle is streamed with Gold, and hath a Traine. Then the *Herald* with three Curtesies, or rather Inclinations, commeth vp as farre as the Halfe-pace; And ther first taketh into his Hand the Scrowle. This Scrowle is the *Kings Charter*, containing Guift of Reuenew, and many Priuiledges, Exemptions, and Points of Honour, granted to the *Father* of the *Family*; And it is euer stiled and directed; *To such an one, Our welbeloued Friend and Creditour*: Which is a Title proper onely to this Case. For they say, the King is Debter to no Man, but for Propagation of his Subiects, The Seale set to the *Kings Charter*, is the Kings Image, Imbossed or moulded in Gold; And though such *Charters* bee expedited of Course, and as of Right, yet they are varied by discretion, according to the Number and Dignitie of the *Family*. This *Charter* the *Herald* readeth aloud; And while it is read, the *Father* or *Tirfan*, standeth vp, supported by two of his Sonnes, such as hee chooseth. Then the *Herald* mounteth the Halfe-Pace, and deliuereth the *Charter* into his Hand: And with that there is an Acclamation, by all that are present, in their Language, which is thus much; *Happy are the people of Bensalem*. Then the *Herald* taketh into his Hand from the other Child, the Cluster of Grapes, which is of Gold; Both the Stalke, and the Grapes. But the Grapes are daintely enamelled; And if the Males of the *Family* be the greater number, the Grapes are enamelled Purple, with a little Sunne sett on the Topp; If the Females, then they are enamelled into a greenish yellow, with a Crescent on the Topp. The Grapes are in number as many as there are Descendents of the *Family*. This Golden Cluster, the *Herald* deliuereth also to the *Tirfan*; Who presently deliuereth it ouer, to that Sonne, that hee had formerly

merly chosen, to bee in House with him: Who beareth it before his *Father*, as an Ensigne of Honour, when he goeth in publicke euer after; And is thereupon called *the Sonne of the Vine*. After this Ceremony ended, the *Father* or *Tirisan* retireth; And after some time commeth forth againe to Dinner, where he sitteth alone vnder the State, as before; And none of his Descendants sit with him, of what Degree or Dignitie soeuer, except he hap to be of *Salomons House*. Hee is serued onely by his owne Children, such as are Male; who performe vnto him all seruice of the Table vpon the knee; And the Women only stand about him, leaning against the wall. The Roome belowe the Halfe-pace, hath Tables on the sides for the Ghests that are bidden; Who are serued with great and comely order; And towards the end of Dinner (which in the greatest Feasts with them, lasteth neuer aboue an Houre and an halfe) there is an *Hymne* sung, varied according to the Inuention of him that composeth it; (for they haue excellent Poesie,) But the Subiect of it is, (alwayes,) the prayles of *Adam*, and *Noah*, and *Abraham*; Wherof the former two Peopled the World; and the last was the *Father* of the Faithfull: Concluding euer with a Thankesgiuing for the Natiuitie of our *Sauour*, in whose Birth, the Births of all are onely Blessed. Dinner being done, the *Tirisan* retireth againe; And hauing withdrawne himselfe alone into a place; where hee maketh some priuate Prayers, hee commeth foorth the third time, to giue the Blessing; with all his Descendants, who stand about him, as at the first. Then he calleth them forth by one and by one, by name, as he pleaseth, though seldome the Order of Age bee inuerted. The person that is called, (the Table being before remoued,) kneeleth downe before the Chaire, and the *Father* layeth his Hand, vpon his Head, or her Head, and giueth the Blessing in these Wordes; *Sonne of Bensalem*, (or *Daughter of Bensalem*,) thy *Father* saith it; *The Man by whom thou hast Breath and Life* speaketh the word; *The Blessing of the Euerlasting Father*,

the Prince of Peace, and the Holy Dove bee upon thee, and make the dayes of thy Pilgrimage, good, and many. This he saith to euery of them; And that done, if there be any of his Sonnes, of eminent Meritt and Vertue, (so they be not aboue two,) hee calleth for them againe; And saith, laying his Arme ouer their Shoulders, they standing; Sonnes, *it is well yee are borne, giue God the prayse, and perseuere to the end.* And withall deliuereth to either of them a lewel, made in the Figure of an Eare of Wheat, which they euer after weare in the front of their Turban, or Hatt. This done, they fall to Musicke and dances, And other Recreations, after their manner, for the rest of the day. This is the full order of that *Feast.*

By that time, sixe or leuen Dayes were spent, I was fallen into straight Acquaintance, with a *Merchant* of that *Citty*, whose Name was *Ioabin*. Hee was a *Iew* and *Circumcised*: For they haue some fewe Stirps of *Iewes*, yet remaining among them, whom they leaue to their owne Religion. Which they may the better doe, because they are of a farre differing Disposition from the *Iewes* in other Parts. For whereas they hate the name of *CHRIST*; And haue a secret inbred Rancour against the People amongst whom they liue; These (contrariwise) giue vnto our *SAVIOUR* many high Attributes, and loue the *Nation* of *Bensalem*, extreamely. Surely this Man, of whom I speake, would euer acknowledge, that *CHRIST* was borne of a *Virgin*; And that hee was more then a Man; And hee would tell how *GOD* made him Ruler of the *Seraphims*, which guard his Throane; And they call him also the *Milken Way*, and the *Eliab* of the *Messiah*; And many other High Names; which though they bee Inferiour to his Diuine Maiestie, Yet they are farre from the Language of other *Iewes*. And for the Countrey of *Bensalem*, this Man would make no ende of commending it; Being desirous by Tradition among the *Iewes* there, to haue it beleeued, that the People thereof were of the Generations of *Abraham*, by another Sonne, whom they call *Nachoran*; And that

that *Moses* by a secret *Cabala* ordained the Lawes of *Bensalem* which they now vse; And that when the *Messiah* should come, and sit in his Throne at *Hierusalem*, the King of *Bensalem*, should sit at his feet, whereas other Kings should keepe a great distance. But yet setting aside these *Jewish* Dreames, the Man was a wise Man, and learned, and of great Pollicie, and excellently seene in the Lawes and Customes of that Nation. Amongst other Discourses, one day, I told him, I was much affected with the Relation I had, from some of the Company, of their Custome, in holding the *Feast of the Family*; For that (me thought) I had neuer heard of a Solemnity, wherein Nature did so much preside. And because Propagation of Families, proceedeth from the Nuptiall Copulation, I desired to know of him, what Lawes and Customes they had concerning Marriage; And whether they kept Marriage well; And whether they were tyed to one Wife; For that wher Population is so much affected, and such as with them it seemed to be, ther is commonly Permission of Plurality of Wives. To this he said; You haue Reason for to commend that excellent Institution of the *Feast of the Family*. And indeed wee haue Experience, that those Families, that are partakers of the Blessing of that *Feast*, doe flourish and prosper euer after, in an extraordinary manner. But heare mee now, and I will tell you what I know. You shall understand, that there is not under the Heauens, so chaste a Nation, as this of *Bensalem*; Nor so free from all Pollution, or foulnessse. It is the *Virgin of the World*. I remember, I haue redd in one of your *Europæan* Bookes, of an holy Hermit amongst you, that desired to see the Spirit of Fornication, and there appeared to him, a little foule ugly *Aethiope*. But if he had desired to see the Spirit of Chastitie of *Bensalem*, it would haue appeared to him, in the likeness of a faire beautifull Cherubin. For there is nothing, amongst Mortall Men, more faire and admirable, then the Chast Mindes of this People. Know therefore, that with them ther are no Stewes, no dissolute Houses, no Curtisans, nor any thing of that kind. Nay they wonder (with detestation) at you in Europe, which

permit such things. They say ye haue put Marriage out of office:
 For Marriage is ordained a Remedy for vnlawfull Concupiscence;
 And Naturall Concupiscence seemeth as a spurr to Marriage. But
 when Men haue at hand a Remedy, more agreeable to their cor-
 rupt Will, Marriage is almost expulsed. And therefore ther are
 with you scene infinite Men, that marry not, but chuse rather a
 libertine and impure single Life, then to be yoaked in Marriage;
 And many that doe marry, marry late, when the Prime and
 Strength of their Yeares is past. And when they doe marry, what
 is Marriage to them, but a very Bargaine; Wherin is sought
 Alliance, or Portion, or Reputation, with some desire (almost in-
 different) of Issue; And not the faithfull Nuptiall Vnion of Man
 and Wife, that was first instituted. Neither is it possible, that
 those that haue cast away so basely, so much of their Strength,
 should greatly esteeme Children, (being of the same Matter,) as
 Chast Men doe. So Likewise during Marriage is the Case much
 amended, as it ought to bee if those things were tolerated onely
 for necessitie. No, but they remaine still as a very Affront to
 Marriage. The Hunting of those dissolute places, or resort to
 Curtizans, are no more punished in Married Men, then in Bat-
 chellers. And the depraued Custome of change, and the Delight in
 Meretricious Embracements, (wher sinne is turned into Art,)
 maketh Marriage a dull thing, and a kinde of Imposition, or Taxe.
 They beare you defend these things, as done to auoyd greater Euills;
 As Aduoutries, Deflowering of Virgins, Vnnaturall lust, and the
 like. But they say, this is a preposterous Wisdome; And they call it
 Lot's offer, who to saue his Guests from abusing, Offered his
 Daughters: Nay they say further, That ther is little gained in this;
 For that the same Vices and Appetites, doe still remayne and a-
 bound; Vnlawfull Lust being like a Furnace, that if you stopp
 the Flames altogether, it will quench; But if you giue it
 any vent, it will rage. As for Masculine Loue, they haue no
 touch of it; And yet ther are not, so faithfull and inuiolate Friend-
 ships, in the world againe, as are ther: And to speake gene-
 rally, (as I said before,) I haue not read of any such Chastity,
 in any People, as theirs. And their vsuall saying is, That who-
 focuer is vnchast cannot reuerence himselfe: And they say;
 That

That the Reuerence of a Mans selfe, is, next Religion, the chiefeft Bridle of all Vices. And when hee had said this, the good *Iew* pawfed a little ; Whereupon, I farr more willing to heare him speake on, then to speake my selfe ; yet thinking it decent, that vpon his pause of Speech, I should not be altogether silent, said onely this ; That I would say to him, as the Widow of Sarepta said to Elias ; that hee was come to bring to Memory our Sinnes ; And that I confesse the Righteousnesse of Bensalem, was greater then the Righteousnesse of Europe. At which speech hee bowed his Head, and went on in this manner. They haue also many wise and excellent Lawes touching Marriage. They allow no Polygamy. They haue ordained that none doe intermarry or contract, untill a Moneth bee past from their first Inter-viue. Marriage without consent of Parents they doe not make voyde, but they mulct it in the Inheritours : For the Children of such Marriages, are not admitted to inherit, aboue a third Part of their Parents Inheritance. I haue read in a Booke of one of your Men, of a Faigned Common-wealth, wher the Married Couple are permitted, before they Contract, to see one another Naked. This they dislike : For they thinke it a Scorne, to giue a Refusall after so Familiar Knowledge : But because of many hidden Defects in Men and Womens Bodies, they haue a more Ciuill Way : For they haue neare euery Towne, a Couple of Pooles, (which they call Adam and Eues Pooles,) wher it is permitted to one of the friends of the Man, and another of the friends of the Woman, to see them seuerally bath Naked.

And as wee were thus in Conference, ther came one that seemed to be a Messenger, in a rich Huke, that spake with the *Iew* : whereupon hee turned to mee, and said ; You will pardon mee, for I am commanded away in hast. The next Morning he came to mee againe, ioyfull as it seemed, and said ; There is word come to the Gouvernour of the City, that one of the Fathers of Salomons House, will bee here this day Seuen-night : Wee haue seene none of them this Dozen Yeares. His Comming is in State ; But the Cause of his coming is secret. I will provide you, and your Fellowes, of a good Standing

Standing, to see his Entry. I thanked him, and told him; *I was most glad of the Newes.* The Day being come he made his Entry. Hee was a Man of middle Stature, and Age, comely of Person, and had an Aspect as if he pittied Men. He was cloathed in a Roabe of fine blacke Cloath, with wide Sleeues, and a Cape. His vnder Garment was of excellent white Linnen, downe to the Foote, girt with a Girdle of the same; And a Sindon or Tippet of the same about his Necke. Hee had Gloues, that were curious, and sett with Stone; And Shoes of Peach-coloured Veluet. His Neck was bare to the Shoulders. His Hatt was like a Helmet, or *Spanish Montera*; And his Locks curled below it decently: They were of Colour browne. His Beard was cutt round, and of the same colour with his Haire, somewhat lighter. He was carried in a rich Chariott, without Wheelles, Litter-wise; With two Horses at either end, richly trapped in blew Vellett Embroydered; and two Footmen on each side in the like Attire. The Chariott was all of Cedar, gilt, and adorned with Chrystall; Saue that the Fore-end had Pannells of Sapphires, set in Borders of Gold; And the Hinder-end the like of Emeralds of the *Peru* Colour. Ther was also a Sunn of Gold, Radiant vpon the Topp, in the Midst; And on the Topp before, a small *Cherub* of Gold, with Wings displayed. The Chariot was couered with Cloath of Gold tissued vpon blew. He had before him fifty Attendants, young Men all, in white *Satten* loose Coates to the Mid Legg; And Stockins of white Silk; And Shoes of blew Veluet; And Hatts of blew Veluett; with fine Plumes of diuerse Colours, sett round like Hat-bands. Next before the Chariott, went two Men, bare headed, in Linnen Garments downe to the Foote, girt, and Shoes of blew Veluett; Who carried, the one a Crosier, the other a Pastorall Staffe like a Sheepe-hooke: Neither of them of Mettall, but the Crosier of Balme-wood, the Pastorall Staffe of Cedar. Horse-Men he had none, neither before, nor behinde his Chariott: As it seemeth to auoyd all Tumult and Trouble. Behinde his

his Chariott, went all the Officers and Principalls of the Companies of the City. He sate alone, vpon Cushions, of a kinde of excellent Plush, blew; And vnder his Foote curious Carpetts of Silk of diuerse Colours, like the Persian, but farr finer. He held vp his bare Hand, as he went, as blessing the People, but in Silence. The Street was wonderfully well kept; So that ther was neuer any Army had their Men stand in better Battell-Array, then the People stood. The Windowes likewise were not crouded, but euery one stood in them, as if they had been placed. When the shew was past, the Jew said to me; *I shall not be able to attend you as I would, in regard of some charge the City hath lay'd vpon me, for the Entertaining of this Great Person.* Three dayes after the Jew came to me againe, and said; *Yee are happy Men; for the Father of Salomons House taketh knowledge of your Being here, and commanded me to tell you, that he will admitt all your Company to his presence, and haue priuate Conference with one of you, that ye shall choose: And for this hath appointed the next day after too Morrow. And because he meaneth to giue you his Blessing, he hath appointed it in the Forenoone.* We came at our Day, and Houre, and I was chosen by my Fellowes for the priuate Access. We found him in a faire Chamber, richly hanged, and carpetted vnder Foote, without any Degrees to the State. He was sett vpon a Low Throne richly adorned, and a rich Cloath of State ouer his Head, of blew Sattin Embroidered. He was alone, saue that he had two Pages of Honour, on either Hand one, finely attired in White. His Vnder Garments were the like that we saw him weare in the Chariott; but in stead of his Gowne, he had on him a Mantle with a Cape, of the same fine Black, fastned about him. When we came in, as we were taught, we bowed Lowe at our first Entrance; And when we were come neare his Chaire, he stood vp, holding forth his Hand vngloued, and in Posture of Blessing; And we euery one of vs stooped downe, and kissed the Hemme of his Tipper. That done, the rest departed, and I remayned.

Then

Then hee warned the Pages forth of the Roome, and caused mee to sit downe beside him, and spake to me thus in the Spanish Tongue.

GOD blesse thee, my Sonne; I will giue thee the greatest Iewell I haue. For I will impart vnto thee, for the Loue of GOD and Men, a Relation of the true State of Salomons House. Sonne, to make you know the true state of Salomons House, I will keepe this order. First I will set forth vnto you the End of our Foundation. Secondly, the Preparations and Instruments we haue for our VVorkes. Thirdly, the seuerall Employments and Functions wher-to our Fellowes are assigned. And fourthly the Ordinances and Rites which we obserue.

The End of our Foundation is the Knowledge of Causes, and Secrett Motions of Things; And the Enlarging of the bounds of Humane Empire, to the Effecting of all Things possible.

The Preparations and Instruments are these. We haue large and deepe Caues of seuerall Depths: The deepest are sunke 600. Fathome: And some of them are digged and made vnder great Hills and Mountaines: So that if you reckon together the Depth of the Hill, and the Depth of the Caue, they are (some of them) aboue three Miles

Miles deepe. For wee finde, that the Depth of a Hill, and the Depth of a Caue from the Flat, is the same Thing; Both remote alike, from the Sunn and Heauens Beames, and from the Open Aire. These Caues we call the Lower Region; And wee vse them for all Coagulations, Indurations, Refrigerations, and Conseruations of Bodies. We vse them likewise for the Imitation of Naturall Mines; And the Producing also of New Artificiall Mettalls, by Compositions and Materialls which we vse, and lay ther for many yeares. Wee vse them also sometimes, (which may seeme strange,) for Curing of some Diseases, and for Prolongation of Life, in some Hermits that choose to liue ther, well accommodated of all things necessarie, and indeed liue very long; By whom also we learne many things.

Wee haue Burialls in seuerall Earths, wher we put diuers Cements, as the Chineses doe their Porcellane. But we haue them in greater Varietie, and some of them more fine. We haue also great variety of Composts, and Soiles, for the Making of the Earth Fruitfull.

We haue High Towers; The Highest about halfe a Mile in Heigth; And some of them likewise set vpon High Mountaines: So that the Vantage of the Hill with the Tower, is in the highest of them three Miles at least. And these Places wee call the Vpper Region; Accounting the Aire betweene the High Places, and the

Lowe,

Lowe, as a Middle Region. Wee vse these Towers, according to their severall Heights, and Situations, for Insolation, Refrigeration, Conservation; And for the View of diuers Meteors; As VVindes, Raine, Snow, Haile; And some of the Fiery Meteors also. And vpon them, in some Places, are Dwellings of Hermits, whom wee visit sometimes, and instruct what to obserue.

We haue great Lakes both Salt, and Fresh, wherof we haue vse for the Fish, and Fowle. We vse them also for Burialls of some Naturall Bodies: For we finde a Difference in Things buried in Earth, or in Aire below the Earth; and things buried in VVater. We haue also Pooles, of which some doe straine Fresh VVater out of Salt; And others by Art doe turne Fresh VVater into Salt. We haue also some Rocks in the Midst of the Sea; And some Bayes vpon the Shore for some VVorks, wherin is required the Ayre and Vapour of the Sea. We haue likewise Violent Streames and Cataracts, which serue vs for many Motions: And likewise Engines for Multiplying and Enforcing of VVindes, to set also on going diuerse Motions.

We haue also a Number of Artificiall VVels, and Fountaines, made in Imitation of the Naturall Sources and Bathes; As tinted vpon Vitrioll, Sulphur, Steele, Brasse, Lead, Nitre, and other Mineralls.. And againe wee haue little VVells

VVells for Infusions of many Things, wher the VVaters take the Vertue quicker and better, then in Vessells, or Basins. And amongst them we haue a VVater, which wee call VVater of Paradise, being, by that we doe to it, made very Soueraigne for Health, and Prolongation of Life.

We haue also Great and Spacious Houses, wher we imitate and demonstrate Meteors; As Snow, Haile, Raine, some Artificiall Raines of Bodies, and not of VVater, Thunders, Lightnings; Also Generations of Bodies in Aire; As Froggs, Flies, and diuerse Others.

We haue also certaine Chambers, which wee call Chambers of Health, wher wee qualifie the Aire as we thinke good and proper for the Cure of diuerse Diseases, and Preseruatiō of Health.

Wee haue also faire and large Baths, of seuerall Mixtures, for the Cure of Diseases, and the Restoring of Mans Body from Arefaction: And Others for the Confirming of it in Strength of Sinnewes, Vitall Parts, and the very Iuyce and Substance of the Body.

We haue also large and various Orchards, and Gardens; Wherin we do not so much respect Beauty, as Variety of Ground and Soyle, proper for diuerse Trees, and Herbs: And some very spacious, wher Trees, and Berries are set, wherof we make diuerse Kinds of Drinks, besides the Vine-yards. In these wee practise likewise all Conclusions of Grafting, and Inoculating, as well of VVilde-Trees,

as Fruit-Trees, which produceth many Effects. And we make (by Art) in the same Orchards, and Gardens, Trees and Flowers, to come earlier, or later, then their Seasons; And to come up and beare more speedily then by their Naturall Course they doe. We make them also by Art greater much then their Nature; And their Fruit greater, and sweeter, and of differing Tast, Smell, Colour, and Figure, from their Nature. And many of them we so Order as they become of Medicinall Vse.

Wee haue also Meanes to make diuerse Plants, rise by Mixtures of Earthes without Seedes; And likewise to make diuerse New Plants, differing from the Vulgar; and to make one Tree or Plant turne into another.

We haue also Parks, and Enclosures of all Sorts, of Beasts, and Birds; which wee vse not onely for View or Rarenesse, but likewise for Dissections, and Trialls; That therby we may take light, what may be wrought upon the Body of Man. Wherein we finde many strange Effects; As Continuing Life in them, though diuerse Parts, which you acount Vitall, be perished, and taken forth; Resuscitating of some that seeme Dead in Appearance; And the like. We try also all Poysons, and other Medicines vpon them, as well of Chyrurgery, as Phisicke. By Art likewise, we make them Greater, or Taller, then their Kinde is; And contrary-wise Dwarfe them and stay their Growth:

Wee

Wee make them more Fruitfull, and Bearing then their Kind is; And contrary-wise Barren and not Generatiue. Also we make them differ in Colour, Shape, Actiuity, many wayes. We finde Meanes to make Commixtures and Copulations of diuerse Kindes; which haue produced many New Kinds, and them not Barren, as the generall Opinion is. We make a Number of Kindes, of Serpents, Wormes, Flies, Fishes, of Putrefaction; Whereof some are aduanced (in effect) to be Perfect Creatures, like Beastes, or Birds; And haue Sexes, and doe Propagate. Neither doe we this by Chance, but wee know before hand, of what Matter and Commixture, what Kinde of those Creatures will arise.

Wee haue also Particular Pooles, wher we make Trialls vpon Fishes, as we haue said before of Beasts, and Birds.

Wee haue also Places for Breed and Generation of those Kindes of Wormes, and Flies, which are of Speciall Vse; Such as are with you your Silkwormes, and Bees.

I will not hold you long with recounting of our Brew-Howfes, Bake-Howfes, and Kitchens, wher are made diuerse Drinks, Breads, and Meates, Rare, and of speciall Effects. VVines we haue of Grapes; And Drinkes of other Iuyce, of Fruits, of Graines, and of Rootes; And of Mixtures with Honey, Sugar, Manna, and Fruits dryed, and decocted: Also of the Teares or VVoundings

dings, of Trees; And of the Pulp of Canes. And these Drinckes are of severall Ages, some to the Age or Last of fourtie yeares. We haue Drincks also brewed with severall Herbs, and Roots, and Spices; Yea with severall Fleshes, and VVhite-Meates; Wherof some of the Drincks are such, as they are in effect Meat and Drinke both: So that Diuerse, especially in Age, doe desire to liue with them, with little or no Meate, or Bread. And aboue all wee strine to haue Drincks of Extreame Thin Parts, to insinuate into the Body, and yet without all Biting, Sharpenesse, or Fretting; Inso-much as some of them, put vpon the Back of your Hand, will, with a little stay, passe through to the Palme, and yet taste Milde to the Mouth. Wee haue also VVaters, which we ripen in that fashion, as they become Nourishing; So that they are indeed excellent Drinke; And Many will vse no other. Breads we haue of severall Graines, Roots, and Kernells; Yea and some of Flesh, and Fish, Dried; With diuerse kindes of Leaue-nings, and Seasonings: So that some doe extreamely moue Appetites; Some doe Nourish so, as diuerse doe liue of them, without any other Meate; Who liue very long. So for Meates, wee haue some of them so beaten, and made tender, and mortified, yet without all Corrupting, as a VVeake Heate of the Stomach will turne them into good Chylus; As well as a Strong Heate would Meate otherwise prepared. We haue

some

some Meates also, and Breads, and Drinks, which taken by Men, enable them to Fast long after; And some other, that used make the very Flesh of Mens Bodies, sensibly, more Hard and Tough; And their Strength farre greater, then otherwise it would bee.

Wee haue Dispensatories, or Shops of Medicines. Wherein you may easely thinke, if we haue such Variety of Plants, and Liuing Creatures, more then you haue in Europe, (for we know what you haue,) the Simples, Druggs, and Ingredients of Medicines, must likewise be in so much the greater Variety. Wee haue them likewise of diuerse Ages, and long Fermentations. And for their Preparations, wee haue not onely all Manner of Exquisite Distillations, and Separations, and especially by Gentle Heates, and Percolations through diuerse Strainers, yea and Substances; But also exact Formes of Composition, wherby they incorporate almost, as they were Naturall Simples.

Wee haue also diuers Mechanicall Arts, which you haue not; And Stuffles made by them; As Papers, Linnen, Silks, Tissues; dainty VVorkes of Feathers of wonderfull Lustre; excellent Dies, and many others: And Shops likewise as well for such as are not brought into Vulgar use amongst vs, as for those that are. For you must know, that of the Things before recited, many of them are growne into use throughout the Kingdome; But
f yet,

yet, if they did flow from our Invention, wee haue of them also for Patternes and Principalls.

Wee haue also Fournaces of great Diuersities, and that keepe great Diuersitie of Heates: Fierce and Quicke; Strong and Constant; Soft and Milde; Blowne, Quiet, Dry, Moist; And the like. But aboue all we haue Heates, in Imitation of the Sunnes and Heauenly Bodies Heates, that passe diuerse Inequalities, and (as it were) Orbs, Progresses, and Returnes, wherby we produce admirable effects. Besides wee haue Heates of Dungs; and of Bellies and Mawes of Liuing Creatures, and of their Blouds, and Bodies; and of Hayes and Herbs layd vp moist; of Lime vnquenched; and such like. Instruments also which generate Heate onely by Motion. And further, Places for Strong Insolations; And againe Places vnder the Earth, which by Nature, or Art, yeeld Heate. These diuers Heates wee vse, As the Nature of the Operation, which wee intend, requireth.

Wee haue also Perspective-Houses, wher wee make Demonstrations of all Lights, end Radiations: And of all Colours: And out of Things vncoloured and Transparent, wee can represent vnto you all seuerall Colours; Not in Raine-Bowes, (as it is in Gemms, and Prismes,) but of themselues Single. Wee represent also all Multiplications of Light, which wee carry to great Distance, and make so Sharp, as to discerne small Points

Points and Lines. Also all Colourations of Light; All Delusions and Deceits of the Sight, in Figures, Magnitudes, Motions, Colours: All Demonstrations of Shadowes. Wee finde also diuerse Meanes yet vnknowne to you, of Producing of Light, originally, from diuerse Bodies. Wee procure meanes of Seeing Objects a-farr off; As in the Heauen, and Remote Places: And represent Things Neare as A-farr off; And Things A-farr off as Neare; Making Faigned Distances. Wee haue also Helps for the Sight, farr aboue Spectacles and Glasses in vse. Wee haue also Glasses and Meanes, to see Small and Minute Bodies, perfectly and distinctly; As the Shapes and Colours of Small Flies and Wormes, Graines and Flawes, in Gemmes which cannot otherwise be seene, Observations in Vrine and Bloud not otherwise to be seen. Wee make Artificall Raine-Bowes, Halo's, and Circles about Light. Wee represent also all manner of Reflexions, Refractions, and Multiplications of Visuall Beames of Objects.

Wee haue also Pretious Stones of all kindes, many of them of great Beauty and to you vnknowne: Chystalls likewise; And Glasses of diuerse kindes; And amongst them some of Mettals Vitricated, and other Materialls, besides those of which you make Glasse. Also a Number of Fosfiles, and Imperfect Mineralls, which you haue not. Likewise Loadstones of Prodigious Vertue: And other rare Stones, both Naturall, and Artificiall.

Wee haue also Sound-Houles, wher wee practise and demonstrate all Sounds, and their Generation. Wee haue Harmonies which you haue not, of Quarter-Sounds, and lesser Slides of Sounds. Diuerse Instruments of Musick likewise to you vnknowne, some sweeter then any you haue ; Together with Bells and Rings that are dainty and sweet. Wee represent Small Sounds as Great and Deepe; Likewise Great Sounds, Extenuate and Sharpe ; Wee make diuerse Tremblings and VVarblings of Sounds, which in their Originall are Entire. Wee represent and imitate all Articulate Sounds and Letters, and the Voices and Notes of Beasts and Birds. Wee haue certaine Helps, which sett to the Eare doe further the Hearing greatly. Wee haue also diuerse Strange and Artificiall Eccho's, Reflecting the Voice many times, and as it were Tossing it : And some that giue back the Voice Lower then it came, some Shriller, and some Deeper ; Yea some rendring the Voice, Differing in the Letters or Articulate Sound, from that they receiue. Wee haue also meanes to conuey Sounds in Trunks and Pipes, in strange Lines, and Distances.

Wee haue also Perfume-Houses ; wherewith we ioyne also Practises of Tast. Wee Multiply Smells, which may seeme strange. Wee Imitate Smells, making all Smells to breath out of other Mixtures then those that giue them. Wee make diuerse Imitations of Tast likewise, so that they will

will deceyue any Mans Talt. And in this House wee containe also a Confiture-House, wher wee make all Sweet-Meats, Dry and Moist; And diuerse pleasant VVines, Milks, Broaths, and Sallets, farr in greater variety, then you haue.

Wee haue also Engine-Houses, wher are prepared Engines and Instruments for all Sorts of Motions. Ther wee imitate and practise to make Swifter Motions, then any you haue, either out of your Musketts, or any Engine that you haue: And to Make them, and Multiply them more Easily, and with Small Force, by VVheelles, and other Meanes: And to make them Stronger, and more Violent, then yours are; Exceeding your greatest Cannons, and Basilisks. Wee represent also Ordnance and Instruments of VVarr, and Engines of all Kindes: And likewise New Mixtures and Compositions of Gun-Powder, VVilde-Fires burning in VVater, and Vnquenchable. Also Fire-workes of all Variety, both for Pleasure, and Vse. Wee imitate also Flights of Birds; Wee haue some Degrees of Flying in the Ayre. Wee haue Shippes and Boates for Going vnder VVater, and Brooking of Seas; Also Swimming-Girdles and Supporters. Wee haue diuers curious Clocks; And other like Motions of Returne: And some Perpetuall Motions. Wee imitate also Motions of Liuing Creatures, by Images of Men, Beasts, Birds, Fishes, and Serpents. Wee haue also a
f 3 great

great Number of other Various Motions, strange for Equality, Finenesse, and Subtilty.

Wee haue also a Mathematicall House, wher are represented all Instruments, as well of Geometry, as Astronomy, exquisitely made.

Wee haue also Houses of Deceits of the Senses; wher we represent all manner of Feates of Iuggling, False Apparitions, Impostures, and Illusions; And their Fallaces. And surely you will easily beleue, that wee, that haue so many Things truly Naturall, which induce Admiration, could in a VVorld of Particulars deceiue the Senses, if wee would disguise those Things, and labour to make them seeme more Miraculous. But wee doe hate all Impostures, and Lies: Insomuch as wee haue seuerely forbidden it to all our Fellowes, under paine of Ignominy and Fines, that they doe not shew any Naturall worke or Thing, Adorned or Swelling; but onely Pure as it is, and without all Affectation of Strangenesse.

These are (my Sonne) the Riches of Salomons House.

For the seuerall Employments and Offices of our Fellowes; VVee haue Twelue that Sayle into Forraine Countries, vnder the Names of other Nations, (for our owne wee conceale;) Who bring vs the Bookes, and Abstracts, and Patternes of Experiments of all other Parts. These

These wee call Merchants of Light.

Wee haue Three that Collect the Experiments which are in all Bookes. These wee call Depredators.

Wee haue Three that Collect the Experiments of all Mechanicall Arts ; And also of Liberall Sciences ; And also of Practises which are not Brought into Arts. These wee call Mystery-men.

Wee haue Three that try New Experiments such as themselves thinke good. These wee call Pioners or Miners.

Wee haue Three that Drawe the Experiments of the Former Foure into Titles , and Tables, to giue the better light for the drawing of Obseruations and Axiomes out of them. These wee call Compilers.

Wee haue Three that bend themselves, Looking into the Experiments of their Fellowes, and cast about how to draw out of them Things of Vse, and Practise for Mans life, and Knowledge, as well for VVorkes, as for Plaine Demonstration of Causes, Meanes of Naturall Diuinations, and the easie and cleare Discouery , of the Vertues and Parts of Bodies. These wee call Dowry-men or Benefactors.

*Then after diuerse Meetings and Consults of our whole Number, to consider of the former Labours and Collections, wee haue Three that take care, out of them, to Direct New Experiments, of a
Higher*

Higher Light, more Penetrating into Nature then the Former. These wee call Lamps.

Wee haue Three others that doe Execute the Experiments so Directed, and Report them. These wee call Inoculators.

Lastly, we haue Three that raise the former Discoveries by Experiments, into Greater Obseruations, Axiomes, and Aphorismes. These wee call Interpreters of Nature.

Wee haue also, as you must thinke, Nouices and Apprentices, that the Succession of the former Employed Men doe not faile; Besides a great Number of Seruants and Attendants, Men and Women. And this wee doe also: We haue Consultations, which of the Inuentions and Experiences, which wee haue discovered, shall be Published, and which not: And take all an Oath of Secrecie, for the Concealing of those which wee thinke fitt to keepe Secrett: Though some of those we doe reueale sometimes to the State, and some not.

For our Ordinances and Rites: Wee haue two very Long, and Faire Galleries: In one of these wee place Patternes and Samples of all manner of the more Rare and Excellent Inuentions: In the other wee place the Statua's of all Principall Inuentours. There wee haue the Statua of your Columbus, that discovered the
V Vest

West-Indies : Also the Inuentour of Shippes : Your Monke that was the Inuentour of Ordnance, and of Gunpowder : The Inuentour of Musicke : The Inuentour of Letters : The Inuentour of Printing : The Inuentour of Observations of Astronomy : The Inuentour of Works in Mettall : The Inuentour of Glasse : The Inuentour of Silke of the Worme : The Inuentour of Vine : The Inuentour of Corne and Bread : The Inuentour of Sugars : And all these, by more certaine Tradition, then you haue. Then haue we diuerse Inuentours of our Owne, of Excellent Workes ; Which since you haue not seene, it were too long to make Descriptions of them ; And besides , in the right Understanding of those Descriptions, you might easily erre. For upon euery Inuention of Valem, wee erect a Statua to the Inuentour, and giue him a Liberall and Honourable Reward. These Statua's are, some of Brasse ; some of Marble and Touchstone ; some of Cedar and other speciall Woods guilt and adorned ; some of Iron ; some of Siluer ; some of Gold.

Wee haue certaine Hymnes and Seruices, which wee say dayly, of Laud and Thanks to GOD, for his Marueillous Works : And Formes of Prayers, imploring his Aide and Blessing, for the Illumination of our Labours, and the turning of them into Good and Holy Vses.

Lastly, wee haue Circuites or Visits, of diuerse Principall

Principall Cities of the Kingdome; wher, as it commeth to passe, we doe publish such *New Profitable Inventions*, as wee thinke good. And wee doe also declare *Naturall Diuinations of Diseases, Plagues, Swarmes of Hurtfull Creatures, Scarcety, Tempests, Earthquakes, Great Inundations, Cometts, Temperature of the Yeare, and diuerse other Things*; And wee giue Counsell thereupon, what the People shall doe, for the *Preuention and Remedy of them*.

And when Hee had sayd this, Hee stood vp : And I, as I had beene taught, kneeled downe, and He layd his Right Hand vpon my Head, and said; *GOD blesse thee, my Sonne; And GOD blesse this Relation, which I haue made. I giue thee leaue to Publish it, for the Good of other Nations*; For wee here are in *GODS Bosome, a Land vnknowne*. And so hee left mee; Having assigned a Valew of about two Thousand Duckets, for a Bounty to mee and my Fellowes. For they giue great *Largesses*, where they come, vpon all occasions.

The rest was not Perfected.



MAGNALIA NATVRÆ,
PRÆCIPVE QVOAD
VSVS HVMANOS.

THe Prolongation of Life.
The Restitution of Youth in some
Degree.
The Retardation of Age.
The Curing of Diseases counted
Incurable.

The Mitigation of Paine.
More Easie and lesse Loathsome Purgings.
The Encreasing of Strength and Actiuity.
The Encreasing of Ability to suffer Torture or
Paine.

The Altering of Complexions : And Fatnesse,
and Leanness.

The Altering of Statures.

The Altering of Features.

The Encreasing and Exalting of the Intellectuall
Parts.

Versions of Bodies into other Bodies.

Making of New Species.

Transplanting of one Species into another.

Instruments of Destruction, as of VVarre, and
Peyson.

Ex-

Exhilaration of the Spirits, and Putting them in good Disposition.

Force of the Imagination, either upon another Body, or upon the Body it selfe.

Acceleration of Time in Maturations.

Acceleration of Time in Clarifications.

Acceleration of Putrefaction.

Acceleration of Decoction.

Acceleration of Germination.

Making Rich Composts for the Earth.

Impressions of the Aire, and Raising of Tempests.

*Great Alteration; As in Induration, Emolli-
on, &c.*

*Turning Crude and Watry Substances into Oyly
and Vnctious Substances.*

*Drawing of New Foodes out of Substances not now
in Vse.*

*Making New Threds for Apparell; And New
Stuffes; Such as are Paper, Glasse, &c.*

Naturall Diuinations.

Deceptions of the Senses.

Greater Pleasures of the Senses.

Artificiall Mineralls and Cements.

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